



amateur radio

Vol. 34, No. 7
JULY
1966

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Dielectric Strength: 600 volts R.M.S.
Encapsulation: Fireproof Silicone Cement.
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CONDENSERS

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|---|-------|-------|--------|---------------|--------|
| Dielectric Strength: 600 volts R.M.S. | | | | | |
| Encapsulation: Fireproof Silicone Cement. | | | | | |
| Acid Lead: Minimum length 1 1/4 in.—2 1/2 in. s.w.g. dia. | | | | | |
| CONDENSERS | | | | | |
| M.F.D. | Volts | Price | M.F.D. | Volts | Price |
| 3 | 22 | 35c | 30 | 150 | ... |
| 3 | 32 | 35c | 30 | 330 | \$1.35 |
| 5 | 6 | 30c | 50 | 30 to 350 Can | \$1.50 |
| 5 | 12 | 35c | 50 | 450 | \$1.65 |
| 5 | 15 | 35c | 50 | 500 | ... |
| 8 | 10 | 30c | 64 | 18 | 35c |
| 8 | 15 | 30c | 100 | 3 | 35c |
| 8 | 18 | 30c | 100 | 3 | 35c |
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| 10 | 15 | 30c | 160 | 50 | 35c |
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paid, in advance. Issued monthly on the
first of the month, January edition excepted.

HANDBOOK NEGOTIATIONS

It is well known that a committee of the Federal
Executive of the Wireless Institute of Australia has
been engaged in a review of the Regulations governing
the Amateur Service in Australia with senior officers
of the Postmaster-General's Department.

Unfortunately certain information has been pub-
lished which may have given the impression that some
changes have already been made to the operating con-
ditions of the Amateur Service. Indeed three recent
incidents have come to notice of Federal Executive which
have indicated that some Amateurs have misunderstood
the position.

The position is that the negotiations have been com-
pleted but until Ministerial approval is obtained the
amendments agreed cannot be implemented, therefore
it must be stressed that the Regulations and Handbook
remain at present unaltered and all Amateurs are bound
to comply with the provisions of the current Handbook.

Immediately any changes are in fact made all
Amateurs will be notified, probably in the first instance
through the pages of "Amateur Radio."

HAROLD L. HEPBURN, Federal Vice-President, W.I.A.

CONTENTS

| | | |
|--|----|--|
| Your Pye Reporter—Tunable or Crystal Locked | 2 | VK-ZL-Oceania DX Contest, 1966 13 |
| Novistor Converters for 50, 144, 220 and 432 Mc. | 5 | Prediction Charts for July, 1966 14 |
| Sideband | 9 | Publications Committee Reports .. 14 |
| Book Review: | | DX |
| Technical Topics for the Radio Amateur | 10 | New Call Signs |
| The Radio Amateur's Hand- book | 10 | P.A.C.C. Award |
| Project Australia | 11 | V.H.F. |
| Trade Review: Toroid Baluns .. 11 | | Correspondence |
| | | S.W.L. |
| | | Y.R.C. |
| | | Federal and Divisional Monthly News Reports |

YOUR PYE REPORTER—TUNABLE OR CRYSTAL LOCKED

BOB YOUNG,* VK2ZRY

FOR some time now I and my colleagues on the Illawarra six metre net have been discussing the potentialities of Pye Taxiphones. From the price angle they are a real bargain, they are readily available and they contain a receiver which is a real performer, it seems a pity therefore, that such an excellent unit should be stuck on one fixed frequency.

Numerous articles have appeared in relation to converting these units for six metre operation but as yet all such articles have concentrated only on the fixed frequency mode of operation or at most tuning a small portion of the band.

For some time now I have considered that there would be a genuine interest in the modification of one of these units, in such a way that the receiver at least could be used not only in the crystal locked mode but also as a unit which could be tuned over the entire six metre band.

My efforts in this direction have resulted in a relatively simple modification whereby the receiver can be switched from

- a fully crystal locked unit for mobile work to
- a tunable unit capable of covering the whole six metre band.

In both modes of operation the double conversion principle is retained, there is no loss of sensitivity over the tunable range, stability is excellent and the change from one mode to the other does not involve switching of tuned circuits.

THEORY

The receiver as it stands is a double conversion superhet which may be locked on to any selected channel by switching in an appropriate crystal.

For six metre operation the first i.f. frequency is derived by beating the 8th harmonic of the appropriate crystal against the selected channel frequency. The second i.f. (2.9 megacycles) is derived by beating the crystal fundamental against the first i.f. frequency.

The following will be noted: The second i.f. is fixed at 2.9 megacycles. The first i.f. frequency is dependent on the frequency of the appropriate channel selection crystal, which is in turn, determined by the frequency of the channel on which it is desired to lock the receiver. Also the first mixer injection frequency is on the high side of the band. If we denote the desired channel frequency by the letter f and the appropriate crystal frequency by F , we may calculate the crystal frequency for any channel from the ensuing formula—

$$8F - f = F + 2.9$$

$$\text{or } F = \frac{f + 2.9}{7}$$

f and F being expressed in the same units, i.e. Kc. or Mc.

Assuming that your Mark I. or Mark III. receiver has already been modified for fixed frequency work on your own particular net, you already have a crystal and you know the frequency of the first i.f.

MAKING RECEIVER TUNABLE

To make your receiver tunable the following steps are required:

- (1) Modification of the r.f. and mixer coils in order to obtain a flat frequency response over the range 52-54 megacycles.
- (2) The addition of a tunable oscillator suitably coupled to the first mixer and capable of supplying an adequate injection voltage over a range of two megacycles at a frequency below the band, by an amount equal to the first i.f. frequency.
- (3) A switch whereby h.t. may be shifted from the added local oscillator to the harmonic amplifier and crystal oscillator plate or vice versa—depending on the mode of operation required.
- (4) Optional—a regulated h.t. supply for the tunable local oscillator.

Let us now look at the circuit diagram in Fig. 1 which shows in a fully integrated form the entire modification.

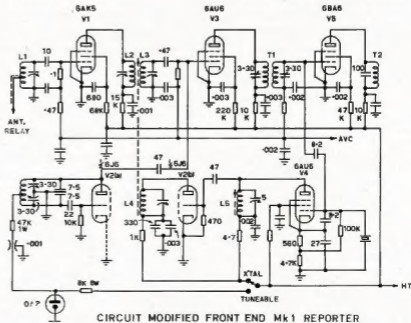
Note These Points:

Close attention to the following points should enable the average Ham to reduplicate my conversion.

(1) The first mixer grid is no longer tapped down on the coil; this results in a negligible loss of gain and achieves a worthwhile increase in effective bandwidth.

(2) The original harmonic amplifier V2, a 6AU6, has been removed and replaced by a 6J6 twin triode. I would advise that in the interests of ultimate stability the corresponding tube socket should be replaced with a quality ceramic or teflon unit. If your unit is to be operated on 12 volts this tube substitution will also necessitate replacement of the 22 ohm heater balance resistor with a 50 ohm unit. One triode section of the 6J6 is now wired into the circuit to replace the original harmonic amplifier. The original harmonic amplifier plate coil is reconnected. The original coupling capacitor from the crystal oscillator is connected to the triode grid which is earthed via a 470K resistor. The 6J6 cathode is earthed. Your taxiphone has now been restored to its original condition except that the harmonic amplifier is now a triode.

At this stage I should like to raise a point of major importance. In some units it will be found that the harmonic amplifier has been used as a quadrupler, the plate tank of the crystal oscillator being tuned to only double the crystal frequency. It is essential that in this operation the crystal frequency be multiplied by four in the crystal oscillator plate circuit, so that the 6J6 triode section functions only as a doubler. Failure to observe this point will result in a serious loss of first mixer injection voltage, which in



CIRCUIT MODIFIED FRONT END Mk1 REPORTER

* Foothills Road, Corrimal.

turn will cause a drastic reduction in conversion efficiency with crystal locked operation.

(3) The remaining triode section is wired up as a tunable v.h.f. Colpitt's oscillator. There is nothing critical in this operation so long as one observes the rules in relation to keeping grid and plate leads as short and rigid as possible. Actual layout will depend on whether you are working on a Mark 1 or a Mark 3. In my own Mark 3 I mounted the tuning gear (a split stator unit with a maximum capacity of 12 pF, a side) the little forward of the space between the crystal sockets. This enabled me to bring an extension shaft to the front panel where a small vernier dial was mounted. The oscillator padders (Philips type concentric trimmers) were fitted at the left side of the gang leaving ample space on the right side for the oscillator plate coil. This coil consists of nine turns spaced to $\frac{1}{2}$ in. and wound on a $\frac{1}{2}$ in. bakelite former. The leads from the coil are taken through to the underside of the chassis via feed-through insulators which were fabricated from the base sections of ordinary plastic spring terminals. The coil is braced centrally by its 47K feed resistor which is anchored to a 0.001 μ F. ceramic feed-through capacitor soldered to the chassis adjacent to the centre of the coil.

(4) The Mark 1 has a vacant socket hole adjacent to the transmitter oscillator tube, this was utilised by adding an OA2 regulator tube fed with h.t. through an 8,000 ohm 5 watt resistor via the function switch. This refinement is not essential. However, if you decide to dispense with it, a different value of h.t. feed resistor to the tunable oscillator will be required in order to obtain optimum first mixer injection for the tunable mode of operation. Remember, a great excess of injection voltage will over bias the mixer and seriously reduce its gain, a moderate increase over the optimum may not appreciably effect conversion gain but it will certainly result in the appearance of birdies.

(5) The function switch may now be mounted in some convenient position. An ordinary s.p.d.t. toggle switch will serve the purpose admirably, the manner in which it is connected up should be clearly indicated in Fig. 1.

(6) The final step requires the re-winding of L1, L2 and L3 so that they may be resonated at 53 megacycles with an absolute minimum of parallel capacitance preferably 5 pF. or less.

The hard work is now completed.

Apply power to your modified receiver, switch to "tunable" set the tuning capacitor at its mid position and with the aid of an absorption wave-meter set the 3-30 pF. trimmers so that the local oscillator resonates at 53 (minus the first i.f.) megacycles, aim at maintaining both trimmers' capacitances equal.

Next check that the oscillator may be tuned over a 2 megacycles range. This can be readily achieved by re-adjusting the coil spacing and trimmer settings.

Having done this and providing your wiring is correct the receiver should be showing signs of life.

The tuning capacitor is reset to its mid position and the r.f. coils peaked for maximum receiver noise.

The next step—tune to 54 megs. and pull out the 6AK5, a sharp drop in receiver noise should result, now tune to 52 megs. and replace the 6AK5, the receiver noise should increase. If these changes do not occur the frequency response of the front end is too sharp and L1, L2 and L3 will need to be stagger-tuned or loaded with 15K resistors. The ultimate aim is to adjust the front end tuning so that anywhere over the range of 52-54 megs. removing the 6AK5 from its socket results in a noticeable drop in noise output at the speaker. This ensures that the receiver will give its maximal usable gain over the entire band with no degradation of signal to noise ratio.

Finally, switch to "crystal locked" and repeat the harmonic amplifier plate tank for maximum noise or better still if there is a relatively weak signal available tune for maximum signal.

Your job is now completed, a few contacts on the band should have you convinced that your receiver is now as good as ever on your net frequency and is equally sensitive over the entire band on "tunable."

Some of the more discerning types may have some doubts because with either mode of operation there remains an unused tuned circuit permanently connected to the first mixer grid. By way of explanation let us consider the case of the receiver functioning as a tunable unit. Here the mixer grid circuit is inductively coupled to the unused harmonic amplifier tank circuit the mixer grid, however, sees nothing more than an absorption wave trap fixed tuned in the region of 65 megacycles, thus there is no degradation of

mixer performance, in fact, in the presence of a strong interfering signal in the region of 65 megacycles this normally unused circuit would prove to be of value in reducing such interference. Considering the case of crystal locked operation a similar situation arises except that the wave trap is now capacitance coupled to the mixer grid and is centred on a frequency of 41 megs. or thereabouts. It is admitted that in this instance the capacitance coupling will result in some loss of signal from the mixer grid but in actual practice the loss is so small that it is not detectable.

Many will say that the top end of the band is dead anyhow, so why bother tuning the entire 2 megacycles range. For the benefit of those with this attitude, may I conclude by making the point that there is an active group in Illawarra on 53.982 with some 20 stations in the Wollongong area alone.

Finally, my thanks to the Wollongong manager of the Pye Service Workshop, Mr. Noel Boyd, who was kind enough to run a lab. check on the above conversion. He used a P.M.G. certified Marconi sig. gen. from which he obtained the following performance data:

- (1) Crystal locked on 53.982 megs. 0.5 microvolt for 50 mW. output. S/N ratio better than 10 db.
- (2) Tunable on 53.982 megs. 0.5 microvolts for 50 mW. output. S/N ratio better than 10 db.
- (3) Tunable 53.983 \pm 1 megacycle. 1.6 microvolt for 50 mW. output. S/N ratio better than 10 db.

The manufacturer's specification for the original Mark 1: 2 microvolts or better for 50 mW. output at 8 db. S/N ratio.

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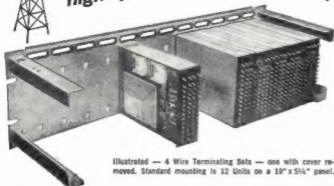
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designed for efficient,
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4 WIRE TERMINATING SETS AND HYBRID COILS



Illustrated — 4 Wire Terminating Sets — one with cover removed. Standard mounting is 12 Units on a 19" x 5 1/4" panel.

For use on high quality amplified voice frequency circuits at points where a 2 wire to 4 wire conversion is required. All units incorporate blocking capacitors in the line and network windings and basic components to provide for the average line balance network. Terminating sets contain variable attenuator pads in both the Hybrid-In and Hybrid-Out sides.

For further information please write giving application details.



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LM53

FOSTER DYNAMIC MICROPHONES

SPECIFICATIONS:

Output Impedance 50 ohms or 50K ohms
Effective output level -55 db. [0 db. — (one) 1V. Microbar]
Frequency response 50 to 15,000 c.p.s.

OMNI-DIRECTIONAL DYNAMIC:

Plastic Diaphragm. Swivel fits 5/8" 26 t.p.i. Stands.
Size: 4 1/2" long, 1 1/4" diameter. Colour: TWO-TONE GREY.
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NUVISTOR CONVERTERS FOR 50, 144, 220 & 432 Mc.

Plus

A NUVISTOR PREAMP. FOR 144 Mc.*

FRANK C. JONES, W6AJF

SOME very good nuvistor tube converters and amplifiers have been described in the past few years. A few more are described briefly in this article, since there are many ways of accomplishing certain results. Some Amateurs like to make exact copies of equipment, while others like to make use of parts of a circuit to work out their own designs for the different v.h.f. bands. The writer falls into this last classification, being one of the old-timers who enjoys building anything from a simple pre-amplifier to a complete communications receiver. There are usually at least two or three v.h.f. converters for each band at W6AJF with complete separate home-built receivers for each type of signal to be received. Examples are one or two each for c.w., n.b.f.m., a.m., and Mars wide-band a.m. signals. The nuvistor converters described here have been some of the many built during the period since my handbook "V.H.F. for the Radio Amateur" first appeared in print. These little gems of u.h.f. tubes were just appearing, too late to be shown in that handbook.

50 Mc. CONVERTER

While nuvistor tubes can be used at low or high radio frequencies, they really begin to shine as performers in the v.h.f. bands. Long life operation, small size, small heat losses and ease of building them into v.h.f. circuits are some of the advantages of nuvistor tubes. A 50 Mc. converter is shown in this photograph and the circuit in Fig. 1. This particular series of converters were all built on 2 by 8 inch strips of copper-clad bakelite for mounting in a 6 x 3 x 17 inch chassis as a bottom cover and shield.

The circuit of Fig. 1 shows the use of pre-selection ahead of the r.f. amplifier followed by two tuned circuits ahead of the mixer tube. The circuits were designed for a Q of approximately 20 in order to pass somewhat more than the 50 to 52 Mc. band desired. If the full 50 to 54 Mc. band is desired, the Q should be reduced to about 12, which would mean less image interference rejection. In the wider band design, the total capacity would be 12 mmf. instead of 20 for the single-ended circuits for the same impedance of about 3300 ohms. More turns would be needed in the coil to tune to the 50 Mc. band when less capacity is used. At W6AJF location, a channel 2 i.f. station practically wipes out the i.f.

Presented below are four converters, using nuvistors exclusively, for 50, 144, 220 and 432 Mc. operation. Also thrown in is a preamplifier for 144 Mc. that performed as well as the 416 B job formerly in use at W6AJF.



Top and bottom views of the 50 Mc. Nuvistor converter. The circuit is shown in Fig. 1. The 50 Mc. input is on the left and the 14-16 Mc. output on the right end.

end of this 6 metre band, so the band width of about 2 Mc. was used in this converter.

The preselector system consists of two tuned circuits capacity coupled. The grid resistor-capacitor in the r.f. stage is solely for tube protection against fairly high power transmitter

feedback in case of faulty antenna relay operation. Operation in the 50 Mc. band requires a low cross-talk front-end design, so cathode bias is used with an external 1000 or 2000 ohm pot in the circuit for gain control.

The r.f. amplifier uses a split plate circuit with two separate variable capacitors for tuning the plate coil to 50 Mc. Adjustment of these two capacitors one way or the other, permits wide band neutralization of this stage with a fixed one mmf ceramic capacitor. The 5K plate feed resistor also tends to produce some balance in the split circuit, so neutralization is easily accomplished and holds very well over a wide band of frequencies. The plate circuit can be either capacity coupled to the mixer grid circuit, or link coupled. The latter provides better circuit balance but less image interference rejection since the oscillator is on the low side (36 Mc.).

The nuvistor mixer plate circuit has to operate at very low Q value so a single parallel tuned circuit is difficult to couple into the usual communication receiver. A pi section resonant circuit is much more effective in coupling the mixer plate impedance of several thousand ohms down to the usual 50 or 70 ohms for co-axial connection to the receiver. An inductance of about 12 microhenries with two capacitors forms a pi coupling circuit suitable for Q values of 2 to 5 (needed to pass 14 to 16 Mc. or even higher values). A 12 microhenry r.f. choke is suitable for this coil. The output capacity of 50 mmf, together with a couple of feet of co-axial line, reduces the output impedance to match the receiver input circuit. If a longer line of co-axial is needed, the 50 mmf capacitor should be omitted. A 1 to 10 mmf trimmer can be used to tune the output circuit to the middle of the i.f.

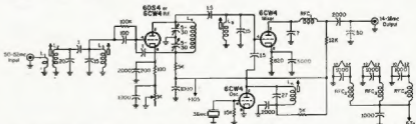


Fig. 1.—Circuit of a 50 Mc. converter using Nuvistor tubes described in the text. All resistors are ½ watt and all capacitors are in mmf.

- L1—1 turn 24 g. enamel on cold end of L2.
- L2, L3—7 turns 24 g. enamel 3-18 in. long on 0.4 in. diameter, air core.
- L4—18 turns 30 g. d.c.c., ¼ in. long, ¼ in. diameter, air core.
- L5—6 turns 24 g. enamel, ¼ in. long on 0.4 in. diameter brass slug tuned form.

- L6—8 turns 24 g. 3-18 in. long on 0.4 in. diameter brass slug tuned form.
- RFC1—12 g. or 80 turns 22 g. enamel ¼ in. long ¼ in. diameter.
- RFC2, RFC3, RFC4—6 or 18 turns small hook-up wire, ¼ in. long, ¼ in. diameter.

* Reprinted from "CQ," January, 1966.

1 Cowden Publishing, 14 Vandeventer Ave., Port Washington, L.I., N.Y. 11050.

band in place of the 7 mmf fixed capacitor.

The oscillator is a standard triode overtone type with a 36 Mc. crystal. All of the single-ended coils were brass-slug tuned. However, some circuit loss can be reduced by using "white" coded ferrite slug tuned coil forms of appropriate number of turns to tune to a little above 50 Mc. with the values of capacitance shown in Fig. 1.

144 Mc. CONVERTER

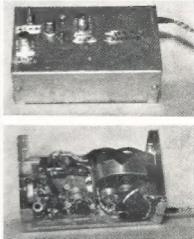
This converter shown in the photograph and in Fig. 2 covers the 2 metre band of 144 to 148 Mc. It was also built on a 2 x 6 inch piece of copper-clad bakelite. An advantage of this type of construction is that a converter may be changed, rebuilt or discarded without much cost or difficulty. The copper-clad board provides an excellent grounding surface which can be easily soldered to with a small soldering iron. All r.f. ground leads can be made very short which generally means better stability, higher gain, and better sensitivity for weak signals.

The circuit of Fig. 2 shows a total of four tuned circuits at 146 Mc. This is about the minimum permissible in

good two-metre converter design. Less may produce excessive image interference problems in most locations. The circuit Q should average about 20. The two grid circuits, r.f. and mixer, will usually be much less due to grid loading and probably will not be over 15. The r.f. plate circuit and second tuned circuit in the three tuned position, can be set up for values of up to 40 or 50 but "unloaded" coil Q values may limit these possibilities. The unloaded Q values should be several times that of the operating Q values in order to minimize tuned circuit losses. Within the limitations set by the passband of four megacycles, the operating Q should be as high as possible in order to provide good image rejection. The image frequencies are 14 to 16 Mc. below the oscillator injection frequency of 130 Mc. or 112 to 116 Mc.

The mixer uses grid leak detection as it is less critical for oscillator injection power than for cathode bias. Its disadvantage is that it is more subject to cross-modulation from strong signals in the two metre band. In some locations, cathode bias detection for mixer action is necessary and some experimenting is needed to get the proper injection voltage. The mixer plate circuit needs to cover from 14 to 18 Mc., which means an operating Q of about 3. The pi-network shown in Fig. 2 accomplishes this effectively and transforms the mixer output load from several thousand ohms down to 50 or 75 ohms. If less than three feet of co-axial is used between the receiver and the converter, some capacitance must be placed across the output jack to make the desired step-down ratio of 6 or 7 to 1.

The oscillator injection of 130 Mc. is obtained by using a 434 Mc. overtone crystal with a single nuvistor tube. The cathode has a low Q circuit resonant around 25 to 30 Mc. to insure oscillation at 434 Mc. and not at the fundamental of around 14 Mc. The plate circuit can then be tuned to 130 Mc., the third harmonic of 434 Mc. There is enough injection power available so an additional 130 Mc. tuned circuit may be used to insure only 130 Mc. voltage reaching the mixer grid circuit.



Top and bottom views of the 144 Mc. preamplifier.

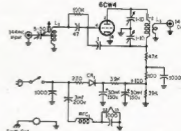


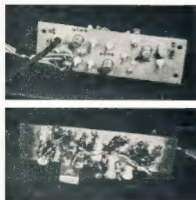
Fig. 2.—Circuit of a 144 Mc. preamplifier. All resistors are 1/2 watt and all capacitors are in mmf. unless otherwise noted.

CR1—Silicon rectifier, 400 p.i.v. any current rating from 30 m.A. up.
L1—3 turns 18 g. enamel, centre tapped, 1/4 in. long on a 1/4 in. diameter slug tuned form.
L2—9 turns 18 g. enamel, 1/4 in. long, 1/4 in. diameter air wound.
L3—1 turn 18 g. enamel to the centre of L2.
RFC1—8 to 10 turns of small hookup wire 1/4 in. long, 1/4 in. diameter.

144 Mc. PRE-AMPLIFIER

The noise figure of the 144 Mc. converter is in the neighbourhood of 4 db. Two r.f. stages in the converter will lower this to 3 db. but the added gain of an extra stage may produce excessive cross-modulation from strong signals in or near the two metre band. One method is to use an outboard r.f. amplifier which can be plugged into the antenna lead for reception of very weak signals. Normal operation for contacts up to 100 miles or so from average locations can be done without the preamplifier.

The preamplifier shown in the photograph and in the circuit of Fig. 3 was built with its own power supply in order to see if it would be as good as the 416B preamplifier described in the previously mentioned handbook. The noise figure measured within a few tenths of a db. Since tube life of a nuvistor is apt to be much greater than for a 416B, the later now is in storage at WSAJF.



Top and bottom views of the 144 Mc. converter. The 144 Mc. input is on the right and the output, 14 to 18 Mc., is taken out on the co-axial on the left.

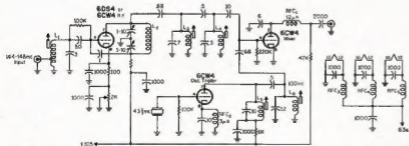


Fig. 2.—Circuit of a 144 Mc. converter using Nuvistor tubes. All resistors are 1/2 watt and all capacitors are in mmf.

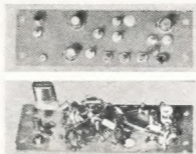
L1—5 turns 20 g. d.c.c. tapped 2 turns up from ground, 1/4 in. long on 1/4 in. diameter slug tuned form.
L2—5 turns on 18 g. enamel, 1/4 in. long, 1/4 in. diameter air wound.
L3, L4—5 turns 20 g. d.c.c., 1/4 in. long on 1/4 in. diameter slug tuned form.

L5, L6—4 turns 20 g. d.c.c. 1/4 in. long on 1/4 in. diameter slug tuned form.
RFC1—12 oh. or 30 turns 32 g. enamel, 1/4 in. long, 1/4 in. diameter.
RFC2—3 oh. or 34 turns 28 g. enamel, 1/4 in. long, 1/4 in. diameter.
RFC3, RFC4, RFC5—8 to 10 turns of small hookup wire, 1/4 in. long, 1/4 in. diameter.

The input circuit is tuned for best noise figure at 144 Mc. by adjusting the slug coil and series antenna capacitor. A noise generator is needed for this purpose since these adjustments usually are not the same as for maximum r.f. gain. The plate circuit is tuned to 144 Mc. by means of the two variable capacitors with one set at a different value than the other in order to get neutralization. These adjustments can be juggled back and forth until the amplifier does not oscillate and best noise figure is obtained. Grid leak bias was used in order to get best noise figure but this makes the tube subject to cross modulation from local two metre stations. In some locations, cathode bias on the 6CW4 tube would be necessary with probably not over 0.1 or 0.2 db. of deterioration.

The built-in power supply is about as simple as possible. The heater voltage is dropped to about 6 volts by means of a 3 mf. paper capacitor in the 115 v.a.c. line. This method causes quite a time lag in the tube reaching normal operation after the a.c. switch is turned on as compared to the use of a filament transformer. The 3 mf. capacitor takes less space and has no heat loss. The preamplifier uses about 7 mA.

of plate current at 100 to 125 volts, so both heater and plate supply may be taken from a receiver, or converter power supply.



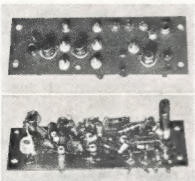
Top and bottom views of the 432 Mc. converter. The bottom view shows the input pi-network on the left and the output tank L5 on the extreme right.

220 Mc. CONVERTER

This converter, shown in one photograph and the circuit diagram of Fig. 4, was built for average signal reception in the 220 to 226 Mc. region with an i.f. output of 14 to 19 Mc. For very weak signal reception, a 222 Mc. paramp is used at W6AJF ahead of this and other 220 Mc. converters.

The single tuned double coil circuit in the r.f. stage grid circuit was used to more effectively ground out an i.f. signal. It seemed to be getting through the converter for a period of time during on-air tests. The improvement was not very great and wasn't entirely fixed without the use of a preamplifier, until the commercial station seemed to go out of operation (probably a temporary cure).

The circuit of Fig. 4 is quite similar to that of the 144 Mc. converter except for coil and capacitor values. A 684 Mc. crystal was not available so a surplus 22.9 Mc. one was used. A 681 Mc. crystal could be used with a cathode



Top and bottom views of the 220 Mc. converter. In the bottom view the multiplier crystal may be seen to the left of the 22.9 Mc. plug-in unit.

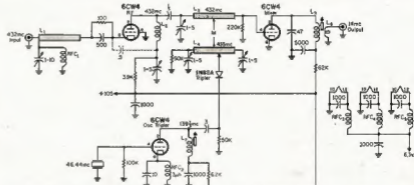


Fig. 5.—Circuit of a 432 Mc. converter. The output with the link coupled circuit shown above is at 14 Mc. with a 1 Mc. passband. For wider coverage the pi-network similar to that shown in Fig. 2 or Fig. 4 should be used. All resistors are 1/2 watt and all capacitors are in mmf.

- L1—1/4 in. wide copper strap, 1 1/4 in. long.
- L2—3 turns 1/4 in. copper strap, 1/4 in. diameter.
- L3, L4—1/4 in. wide copper strap, 1 1/4 in. long, spaced 1/4 in. to 1/4 in. apart.
- L5—45 turns 22 g. enamel 1/4 in. long, wound on 1/4 in. diameter slug tuned form.
- L6—4 turns hookup wire link on cold end of L5.

- L7—6 turns 22 g. enamel 1/4 in. long, wound on 1/4 in. diameter slug tuned form.
- RFC1—8 turns 20 or 22 g. enamel 1/4 in. long, 1/4 in. diameter.
- RFC2—3 turns 22 g. enamel 1/4 in. long, 1/4 in. diameter.
- RFC3, RFC4, RFC5—8 to 10 turns small hook-up wire, 1/4 in. long, 1/4 in. diameter.

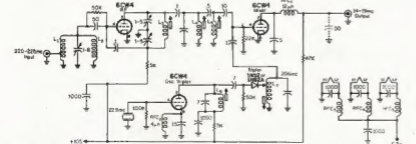


Fig. 4.—Circuit of a 220 Mc. Nuvistor converter with an i.f. output from 14 to 19 Mc. All resistors are 1/2 watt and all capacitors are in mmf.

- L1—4 turns 20 g. d.c.c., tapped 1 turn up from ground, 1/4 in. long, 1/4 in. diameter, air wound.
- L2—4 turns 20 g. d.c.c., 1/4 in. long, 1/4 in. diameter, air wound.
- L3—7 turns 20 g. d.c.c., 1/4 in. long, 1/4 in. diameter, air wound.
- L4, L5—4 turns 22 g. enamel, 1/4 in. long wound on 3-16 in. diameter slug tuned form.
- L6—12 turns 24 g. enamel 1/4 in. long, on 3-16 in. diameter slug tuned form.
- L7—4 turns 24 g. enamel 1/4 in. long wound on 3-16 in. diameter slug tuned form. Diode tap point chosen for max. output. See text.
- RFC1—12 ph., 80 turns 22 g. enamel, 1/4 in. long, 1/4 in. diameter.
- RFC2—4 ph., 40 turns 20 g. enamel, 1/4 in. diameter.
- RFC3, RFC4, RFC5—8 to 10 turns of small hookup wire, 1/4 in. long, 1/4 in. diameter.

circuit in the oscillator tube similar to that used in the 144 Mc. converter, with the plate circuit tuned to 208 Mc. The use of a 22.9 Mc. crystal meant that an additional frequency tripler was needed. A type 1N52 or preferably a 1N52A diode can be used to triple the frequency to the desired value of 208 Mc. as shown in Fig. 4. Some diodes will give more output when tapped across only part of the 208 Mc. tuned circuit. The value of grid leak and the coupling capacitor to the diode tripler can also be modified to advantage with some types of diodes.

The noise figure runs at about 5 db. as measured here. The image rejection is only fair due to the higher signal frequency as compared to the i.f. value. The paramp solves that problem very well but can only be used over a small part of the 220 Mc. band. Two or even three grounded grid 6CW4 or 6DS4 nuvistor stages with several more tuned circuits would be a more prac-

(Continued on Page 14)

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SIDE BAND

Sub-Editor: PHIL WILLIAMS, VK6NN

During April we have seen an upsurge in the use of single sideband on the higher frequency bands, viz. 15 and 10 metres. The CQ World-wide DX Contest was a very good indication that the bands could be worked if the stations were there, and it is a good plan to call CQ on these bands, even if you hear nothing. You may be surprised at the answers which come back to your calls. My own listening has been confined to the use of the G5RV antenna pending the erection of the TA33 tri-band beam for 10-15-20 metre operation. The proper use of an aerial tuning unit on these bands makes the old 80-40 metre aerials quite useful, and the DX which can be worked is surprising.

Most of my listening has been done with a recently completed "Deltahet" front end, feeding into an old and unmodified AR7 receiver using Band C coils for tuning 2 to 3 megacycles. This has been a worthwhile project, and I recommend it to any Amateur who

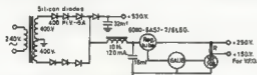


FIG. 1 Regulated dual supply - 250V and 320V

wants to combine a good s.b. receiver with one having general coverage. A number of these have been constructed in VK5 by the v.h.f., s.b. fraternity, and the units will be on display at the May meeting of the South Australian Division. The Editor may note that it is our intention to collect some data on the various models and send to "A.R." for publication. The Deltahet is an excellent medium for tuning those odd frequencies "coughed out" by v.h.f. converters which frequently use the odd cheap crystals not in demand for multiplication to Amateur bands. It is worth noting that a deltahet, fed by a pair of v.h.f. converters using the same nominal Lf. channel for 52 Mcs. and 144 Mcs., has been connected to two tuners, one for a.m. on 2 metres and the other for s.b. on 6 metres. The question of all the "birds" present was not answered, but I am assured that it worked.

Deltahets have been demonstrated to perform as well as most commercial band-switched front-ends. One well-known sidebander has remarked that, following "5PS" reference to s.b. as "the Thing" the "Deltahet" should become known as "the only thing." Why not build one and find out for yourself?

POWER SUPPLIES FOR S.B. EXCITERS

Since this column was instigated for the home-constructor, it has resulted in my receiving numerous enquiries from the older a.m./c.w. men wishing to use existing equipment for their s.b. exciters. In general this can be done, but the high peak currents drawn by the output stage, pose a few problems worth elaborating.

There are certain basic supplies which are required for most exciters, as follows:—

- (1) The 200-250 volt supply for all of the speech amplifiers, oscillators, mixers, and class A driver stage, as well as the screen grids of the output tubes.
- (2) The bias supply of 80 to 100 volts for muting, which is divided down to a level of 30 to 50 volts for the AB1 linear amplifier, on "transmit."
- (3) The 600-800 volt supply to the plates of the output tubes.

adding a single rectifier to that shown in Fig. 1. The 32 μ F. capacitor gives adequate filtering for the final plate supply and the standing current of 25 mA. or so will not embarrass the supply. The 32 μ F. capacity will give adequate dynamic regulation for, say a single 6146 or pair of 807's in class AB1, as the currents will kick up to no more than 50-70 mA. on speech.

An alternative supply without the regulation but with adequate filtering may be obtained from a conventional transformer of 280 to 320 volts per side, with two stages of filtering, the first being a choke input section. Supply for the v.i.o. may be obtained through a dropping resistor with a VR105 regulator tube.

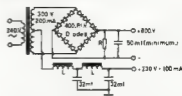


FIG. 2 Economy Dual-voltage Power Supply

The Bias Supply

Unless a 100 volt tap can be organised on the transformer for the 250 volt supply, the simplest method of providing this is to use a 12.6 volt filament transformer in reverse from a 6.3 volt filament winding as shown in Fig. 2. The circuit is self-explanatory. Suitable regulator tubes for this are the VR90, VR75 or 85A2 (CV449).

The same supply may be used for receiver muting, the negative bias supply being built into the transmitter and switched on with the heater supplies to the final stage. The final is, then, never without bias—a most important point to remember.

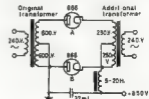


FIG. 3 Use of 6.3V filament transformer in reverse to provide 12.6V bias supply (voltage is subtractive)

There have been designs published for mains power supplies using rectifiers and voltage multipliers direct from the 240 volt a.c. supply. These work very well, but I do not recommend them from the safety viewpoint, and electricity authorities do not approve of such things, either. Provision of a transformer, if only for isolation, is desirable.

Dealing with these supplies in turn, the requirements are, briefly:—

The 250 v. Supply (see Fig. 1)

This may be an electronically regulated supply using a 400-0-400 volt transformer of about 120 mA. rating, and a series tube such as 6AS7, 6080, 12E1 or 2 x 807's. This is the ultimate in the provision of good regulation and low a.c. ripple, and will certainly help with elimination of hum modulation of the modulators and oscillators.

If a large amount of output is not required from the exciter, a supply No. 3 of about 550 volts can be obtained by

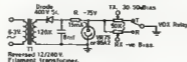


FIG. 4 Bias Supply for S.B. Linear (Class AB1) Amplifier

The Final Plate Supply

This needs to be about 800 volts for adequate output from the exciter for "barefoot" operation, i.e. without a linear amplifier to follow. The supply needs to have good dynamic regulation to supply only 25 to 50 mA. of quiescent current, but up to 200 mA. or so in short impulses for, say a pair of 6146's. A large capacitance filter will do this, and 50 to 100 μ F. of adequately rated electrolytic capacitance may be used. Static regulation is unimportant so that large choke-input filters are not needed. If the old a.m. modulator supply is to be used for this duty, then the old 866 rectifiers (or even 5R4GY) choke input filter with 8 μ F. capacitors may be used, but,

(Continued on Page 10)

SIDEBAND

(Continued from Page 9)

first check that the chokes have very low resistance, and the output capacitor could well be increased to 30 μ F, or so to provide better dynamic regulation.

An excellent method of using one transformer for the whole transmitter (except bias supply) is to adopt the "Economy" power supply using a single transformer of 270 to 300 volts per side and rated at least 150 mA. This is shown in Fig. 3 and shows a full wave bridge supplying the full high tension voltage, with the 250 volt, well filtered supply obtained from the centre tap. The use of silicon diodes to give peak voltage, i.e. 600 x 1.4 or 840 volts, is essential, as the peak currents drawn by the capacitor are sufficient to take the oxide coating from the filament of most rectifiers. Such rectifiers (valves) will not last very long in this service. Choke input filters are a good proposition for most valve rectifiers where such high peak currents are involved, but of course the transformer voltage should be about 1.1 times the output voltage.

The rule for silicon diodes is to use one diode of 400 v. (peak inverse) rating for every 130 volts of transformer output with a 330K resistor across each diode, and 15 ohms of wire-wound resistor per diode in series with the string of diodes.

Finally, a useful trick for increasing the voltage of a power supply which is on the low side, is shown in Fig. 4. A t.v. type transformer of 250-0-250

volts was used to raise the output from a 600 v. modulator power supply to a useful 850 volts for an s.s.b. exciter. If the voltage looks low, simply change over the anode caps.

Next month: "A Few Thoughts on Crystal Filters."

73, Phil 5NN

★

Book Review

TECHNICAL TOPICS FOR THE RADIO AMATEUR

Regular readers of the R.S.G.B. Bulletin will be familiar with the monthly series entitled Technical Topics. Started in 1958, this series of articles attempted very successfully to present new circuits and ideas drawn from various technical publications, together with a few hints and tips, in an effort to keep the average Amateur well informed. The series met with such success over the years that the author, Pat Hawker G3VA, has now produced this book containing the best of the material that appeared in R.S.G.B. Bulletin. It is a worthwhile addition to the library of all Amateurs interested in construction and experimenting with new ideas. The book contains chapters on Semi-conductors, Components and Construction, Receiver Topics, Oscillators, Transmitter Topics, Audio and Modulation, Power Supplies, Aerials and Electrical Interference, and Fault-finding and Accessories.

Publisher, Radio Society of Great Britain; Australian price, \$1.90, postage 12c.

Review copy supplied by Technical Book and Magazine Co. Pty. Ltd., 232-233 Swanston Street, Melbourne, C.I.

THE RADIO AMATEUR'S HANDBOOK

This A.R.R.L. publication has been the standard manual for Amateur Radio communication, construction and design for many years.

However, for the past few years each annual issue has been little different from its predecessor. This 1968 edition is the exception. It is sufficiently different in all departments to warrant purchasing, particularly if your present copy is a few years old. The quality of the paper and drawings has been improved, and quite a number of new constructional articles have been included.

Once again transistors have not been given the coverage that one might expect, but this position improves year by year. Likewise, s.s.b. does not receive very much attention but, of course, the A.R.R.L. Single Sideband for the Radio Amateur completely covers this subject. This 1968 edition contains 704 pages with over 1300 illustrations, including some 500 tube base diagrams.

Publisher, The American Radio Relay League; Australian price, \$8.10 posted.

Our copies from McGill's Authorized Newsagency, 163-165 Elizabeth Street, Melbourne, and Technical Book and Magazine Co. Pty. Ltd., 232-233 Swanston Street, Melbourne, C.I.



DF-2

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SPECIFICATIONS:

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|------------------------|--------------------------------------|
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| Effective output level | —55 db. [0 db. — (one) 1V. Microbar] |
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PROJECT AUSTRALIS

As work progresses towards the launching of Australis 1, the time has arrived to begin one of the biggest tasks connected with the project—the organisation of ground-based tracking and command stations, world-wide news broadcasts, orbital predictions and the passing on of information to all participating organisations. Newsletters will be prepared once a month, and, as the launch date approaches, their distribution will include all the Project Oscar national co-ordinators in all countries interested in Amateur Radio satellites.

While we will attempt to cover all aspects of the Australis I project in these newsletters, we are only human, and we have only a small administrative staff working on the project. Therefore, any comments or criticisms of these newsletters would be appreciated.

PROGRESS REPORT

The Australis I satellite project is going ahead extremely well. As you have probably seen in the press, successful balloon flights of the 2 metre telemetry (1st May) and the 10 metre beacon (15th May) were recently conducted. These two flights proved the soundness of the Australis system. It is now hoped that the flight model Australis I will be completed by about August. After this, testing of the satellite will be carried out at Salisbury, South Australia, before its shipment to the U.S. for launching.

Most of the parts for the satellite have already been donated by several leading electronics firms. The excellent job done by all states in publicising the project undoubtedly helped a great deal in persuading these firms to "come to the party."

TECHNICAL DETAILS

The technical details of Australis I have now been finalised, apart from one or two minor points. Here, briefly, is a functional description of the satellite:

H.F. Beacon: The h.f. beacon will radiate a c.w. signal on 29,450 Mc., at 250 mW output. Every 80 seconds the letters VK will be transmitted for 10 seconds, in c.w. Each VK will take 1 second, with a 1-second break between VK's, so that 5 VK's will be sent during the 10-second period. At the end of each 10-second VK transmission, the h.f. beacon will revert to c.w. operation for the next 70 seconds, after which the 10-second VK sequence will be repeated, and so on. Because of the heavy battery drain imposed by the h.f. beacon, it will have to be commanded on and off the ground—it will not be able to run continuously. It is hoped that it will be on for about five out of every 15 orbits that the satellite completes every day. The command programming schedule will be posted to all co-ordinators before the launch.

V.H.F. Telemetry: The v.h.f. transmitter will operate on 144,050 Mc. and will be modulated by an 8-channel audio tone telemetry system. The eight

telemetry channels will comprise two temperature sensors, a battery voltage and a battery current sensor, two horizon sensors, a magnetic coil attitude sensor and the VK keyer. Each sensor will be sampled for 10 seconds. At the end of each 70-second telemetry read-out, the VK keyer will operate for 10 seconds at the rate of 1 VK each second, with a 1-second pause between each VK. The system will operate in sequence with the h.f. beacon, so that the VK's will appear on the v.h.f. telemetry at the same time as they appear on the h.f. beacon. The v.h.f. telemetry will be transmitted continuously, from launch until the battery is exhausted, approximately two to three months after launch.

Command System: The command receiver and command decoder will operate continuously, from launch until the satellite's batteries are exhausted. The command receiver will also operate on the 2 metre band. The function of the command system is to allow the h.f. beacon to be switched on and off, so that Amateurs around the world can be given an opportunity to monitor the beacon and, it is hoped, use it as an aid in predicting 10 metre band openings. Unless this beacon is commanded off when necessary, the satellite's batteries will be exhausted within a few weeks.

Other Details: Australis I will be an aluminium box-shaped satellite, measuring 17.5 by 12 by 6.5 inches. Four 1/2 wave dipole antennae will serve the telemetry transmitter and the command receiver. A loaded dipole will be used for the 10 metre beacon. The satellite's battery will have a capacity of 1.15 kilowatt-hours and will weigh 21 lb. The total weight of the satellite will be 35 lb. A paint pattern on the outside surface of Australis I will be designed to keep the internal temperature of the satellite at approximately 20 degrees C. No solar cells will be carried on Australis I, because of their very high cost at the present time, and their unavailability in Australia. Because this first satellite is an engineering test vehicle, the lack of solar power is of little importance, as all the necessary data on the performance of the satellite can be obtained during the two to three month life-time of its chemical batteries.

Australis I will carry a pair of small bar magnets, in an attempt to align one axis of the satellite along the Earth's magnetic lines of force. If this can be achieved it will reduce the fading of signals from the satellite, caused by random tumbling as it orbits the Earth. Data on the performance of this system will be transmitted via the v.h.f. telemetry system.

Australis I will be launched from the Western Test Range, California, into a near-circular orbit, about 500 miles above the Earth. Each orbit will take about 1 hour 42 minutes and the orbit will take the satellite between 70 deg. north latitude and 70 deg. south latitude. In this orbit it will cover most of the populated areas of the world at least once a day.

GROUND SUPPORT PLANS

You will appreciate that any satellite launched into orbit is useless unless there is an effective ground support system to track, command and gather data from it. Project Australis is anxious that the State Oscar co-ordinators should begin thinking about tracking the command stations in their states; we are working on the philosophy that there should be at least two primary stations in each state that will be able to receive the v.h.f. telemetry data from the satellite, monitor the h.f. beacon performance and, when necessary, send commands to the satellite to switch the h.f. beacon on and off.

Orbital computations for Australis I will be produced by Project Australis, using the University's IBM 7044 computer to process tracking data supplied by Amateur stations in VK and around the world. This orbital data will be broadcast daily and mailed weekly to all state and national co-ordinators. It is expected that the broadcasts will begin about a month before the launch. They will be on 80, 40 and 20 metres and will probably originate in VK's, although DX-ers in other states may be interested in helping with the transmission of the broadcasts.

★

Trade Review

TOROID BALUNS

"A. & R. Transformers" are now producing a range of "Baluns" suitable for use with transmitting and receiving antenna systems including mobile whips.

There are seven types, all epoxy resin encapsulated and suitable for outdoor use.

Types are available for most of the usual impedances with either S0239 or L804/S type sockets.

Frequency range is 3 to 30 Mcs. and power rating 200 w. or 400 w. p.e.p.

We received two of these transformers types 350A and 355C for inspection and test, and while there were not enough antennae to fully test the samples on the air, the 350A type was tried using co-ax. to feed a 7 Mcs. and 28 Mcs. dipoles, and in both cases no difficulty was experienced in loading the transmitter into each antenna with low s.w.r.

The 355C transformer was then tried using two mobile whips resonant at 7 Mcs and 3.5 Mcs., and when thinking back to when these whips were originally made, and matched to the feed co-ax., then considering the ease with which this unit did the job, the only wish was that they had come along sooner.

From the results obtained from these two units they could be recommended for use in antenna matching and feeding within their specifications.

For further details see "A. & R. Transformers" advertisement in the May issue.

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VK2 DIVISION

Our thanks to everybody who inquired about a copy of the catalogue. These are still available if you have not sent for one yet. A new series in the catalogue will be produced towards the end of this year.

Our special for this month is 2 metre beams. A pair (2) of four-element yagi's cut for the 2 metre band. They are the last of a special order made for the W.I.A. by a local t.v. antenna firm. Same construction as t.v. aerials, they can be folded up which makes them ideal for portable use. They were \$8 each but to clear they have been reduced to \$10 a pair f.o.r. Sydney. Approx. weight 10 lb. packed in carton. Offer will not be repeated so do not delay.

Twenty sets only to clear at \$10 a pair (f.o.r. Sydney). Inquiries to: Radio Equipment Store, Wireless Institute Centre, Crows Nest, N.S.W.

The VK2 Division has conducted a correspondence course for the A.O.C.P. exam, for many years. If you are unable to attend a local club for classes may we suggest that you enrol with us. There are 50 lessons in the course and there are questions at the end of each paper. The total cost is \$36 or in three stages at \$14 each. Attention club committees, if you conduct your own classes you may purchase sets of lecture notes. All inquiries should be directed to the Course Supervisor, Wireless Institute Centre, Crows Nest, N.S.W.

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.



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VK-ZL-OCEANIA DX CONTEST, 1966

N.Z.A.R.T. and W.I.A., the National Amateur Radio Associations in New Zealand and Australia, invite world-wide participation in this year's VK/ZL/Oceania DX Contest

Objects For the world to contact VK/ZL/Oceania Stations and vice versa. **Note:** VK and ZL stations, irrespective of their location do not contact each other for contest purposes.

When? Phone: 24 hours from 1000 G.M.T. Saturday, 1st October, to 1000 G.M.T. Sunday, 2nd October.

C.w.: 24 hours from 1000 G.M.T. Saturday, 8th October, to 1000 G.M.T. Sunday, 9th October.

RULES

1. There shall be three main sections to the contest—

- (a) Transmitting Phone.
- (b) Transmitting C.w.
- (c) Receiving—Phone and C.w. combined.

2. The contest is open to all licensed Amateur transmitting stations in any part of the world. No prior entry need be made, Mobile Marine or other non-land-based stations are not permitted to enter.

3. All Amateur frequency bands may be used but no cross-band operation is permitted.

4. Phone will be used during the first week end and c.w. during the second week end. Stations entering both sections must submit separate logs.

5. Only one contact on c.w. and one contact on Phone per band is permitted with any one station for scoring purposes.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a competitor and must submit a separate log under his own call sign. (This is not applicable to overseas competitors.)

7. Entrants must operate within the terms of their licences.

8. **Cyphers:** Before points can be claimed for a contact, serial numbers must be exchanged and **acknowledged**. The serial number of five or six figures will be made up of the RS (telephony) or RST (c.w.) report plus three figures which may begin with any number between 001 and 100 for the first contact and which will increase in value by one for each successive contact. E.g. If the number chosen for the first contact is 021, then the second must be 022 followed by 023, 024, etc. After reaching 999, start again from 001.

9. **Scoring:** (a) For Oceania Stations other than VK/ZL: 2 points for each contact on a specific band with VK/ZL stations; 1 point for each contact on a specific band with the rest of the world.

(b) For the rest of the world other than VK/ZL: 2 points for each contact on a specified band with VK/ZL

stations; 1 point for each contact on a specific band with Oceania stations other than VK/ZL.

(c) For VK/ZL Stations: 5 points for each contact on a specific band and in addition, for each new country worked on that band, **bonus** points on the following scale will be added:—

| |
|------------------------|
| 1st contact—50 points. |
| 2nd — —40 " |
| 3rd — —30 " |
| 4th — —20 " |
| 5th — —10 " |

For this purpose the A.R.R.L. countries list will be used with the exception that each call area of W/K, JA, SM, UA will count as "countries" for scoring purposes as indicated above.

10. Logs: (A) Overseas Stations:

(a) Logs to show in this order—date, time in G.M.T., call sign of station contacted, band, serial number sent, serial number received, points, underline each new VK/ZL call area contacted. Separate log for each band.

(b) **Summary Sheet** to show call sign, name and address (**block letters**), details of station, and, for each band, QSO points for that band. VK/ZL call areas worked on that band. "All-band" score will be total QSO points multiplied by sum of VK/ZL call area on all bands while "single band" scores will be that band QSO points multiplied by VK/ZL call area worked on that band.

(B) VK/ZL Stations.

(a) Logs must show in this order—date, time in G.M.T., call sign of station worked, band, serial number sent, serial number received, contact points, bonus points. Use a **separate log** for each band.

(b) **Summary** to show—name and address in **block letters**, call sign, score for each band by adding contact and bonus points for that band, and "all band" score by adding the band scores together, details of station and power, declaration that all rules and regulations have been observed.

11. The right is reserved to disqualify any entrant, who, during the contest has not strictly observed regulations or who has consistently departed from the accepted code of operating ethics.

12. The ruling of N.Z.A.R.T. Executive Council will be final.

13. **Awards. VK/ZL Stations:** N.Z.A.R.T. will award certificates to the top scorer on each band and the top scorer in each VK/ZL district and silver-mounted plaques to the top ZL scorers in both the phone and the c.w. sections.

Overseas Stations: Certificates will be awarded to each country (call area in W/K, JA, SM, UA) on the following basis:—

1. Top scorer using "all bands."
2. Top scorer on individual bands.
3. Other certificates may be awarded to be determined by conditions and activity.

14. Entries from VK/ZL Stations should be posted direct to N.Z.A.R.T. Contest Manager, 152 Lytton Road, Gisborne, New Zealand, to arrive not later than 31st December, 1966.

Entries from Overseas Stations should be posted to N.Z.A.R.T., Box 489, Wellington, New Zealand, to arrive not later than 21st January, 1967.

S.W.L. SECTION

1. The rules are the same as for the transmitting section but it is open to all members of any S.W.L. Society in the world. No transmitting station is permitted to enter this section.

2. The contest times and logging of stations on each band per week end are as for the transmitting section except that the same station may be logged twice on any one band—**once on phone and once on c.w.**

3. To count for points logs will take the same form as for transmitting—**as follows**—date, time in G.M.T., call of the station heard, call of the station he is working, RS (T) of the station heard, serial number sent by the station heard, band, points claimed. Scoring is on the same basis as for transmitting section and the summary should be similarly set out.

4. Overseas Stations may log only VK/ZL stations but VK receiving stations may log overseas stations and ZL stations while ZL receiving stations may log overseas stations and VK stations.

5. Certificates will be awarded to the top scorer in each overseas scoring area and in each VK/ZL call area.



R.D. CONTEST RULES

Readers are asked to note that the Rules for the R.D. Contest published last month are almost identical to those for the 1965 Contest. Federal Convention ruled that the rules be changed, but this was not possible in the time available between the end of Convention and the publication deadline.

Anyone with thoughts on how limited licensees should participate in this most popular Australian Contest are asked to communicate with the Federal Contest Manager, 55 Moulden Ave., Mt. Yokine, W. Aust.

— . . . —

ADDITIONAL NATIONAL FIELD DAY RESULT

VK3LC:—Sect. D, 24 hr., 4 operators, comm. equip., 170 contacts, 1505 points.

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Equipment and Components

NUVISTOR CONVERTERS

(Continued from Page 7)

tical method of getting good sensitivity, better image rejection, and complete coverage from 220 to 225 Mc.

432 Mc. CONVERTER

This converter has about as few tubes as can be used for 432 Mc. converter service with crystal control unless one goes to transistors. The converter was built on a 2 x 6 inch copper-clad board with three nuvistor tubes and a diode frequency multiplier. The noise figure seemed to run about 6 db. which could be reduced to about 5 db. by using a nuvistor preamplifier on a separate copper-clad board.

The r.f. stage in Fig. 5 is a grounded grid type in which an attempt was made to reduce regeneration by a small feedback capacitor from plate circuit to cathode. The small trimmer from antenna jack to ground seemed to solve the problem quite effectively and permitted the use of a 432 Mc. paramp ahead of this converter. No regeneration problem was noted when the converter was loaded by a 50 ohm antenna system instead of the paramp.

For best noise figure, the 50 ohm antenna impedance should be stepped up to over 100 ohms for connection to the cathode of a grounded grid 6CW4 tube. This is accomplished by means of a pi circuit consisting of the antenna vari-

able capacitor, the 1 1/2 x 1/2 inch copper strap and the input capacitance of the tube.

The r.f. stage plate circuit consists of a three-turn coil about 1/2 inch long and 1/2 inch diameter made of some more 1/2 inch wide copper strap. The circuit was capacity coupled to a pi circuit into the mixer grid. Another pi circuit tuned to 418 Mc. was inductively coupled to the grid pi circuit by spacing it about 1/2 to 1 inch.

The mixer plate circuit was a parallel tuned circuit peaked at 14 Mc. since all stations in this operate close to 432.0 Mc. If wide band coverage is desired, a low Q pi system similar to that shown in Fig. 4 or Fig. 2 should be used. The parallel tuned circuit is only good for about a 1 Mc. passband at 14 Mc.

The crystal oscillator is similar to that of Fig. 2 with a cathode circuit resonating between the fundamental and third overtone of a 46.44 Mc. crystal. It was also found that a seventh overtone crystal marked 1394 Mc. oscillated quite well in this circuit. The 1394 Mc. plate circuit drives a 1N82A tripler to provide output on 418 Mc. The diode tap on the 418 Mc. line and coupling to the mixer grid line have to be experimentally set for best weak signal response at 432 Mc. A signal generator or a noise generator can be used in these tests.

In all of these converters, power connections were made to 0.001 mf. feed-through capacitors in order to prevent stray signal pick-up. Double

shielded small co-axial lines should be used between the converters and the communications receiver, so strong signals in the 14 to 18 Mc. region will not be troublesome.

Publications Committee Reports That . . .

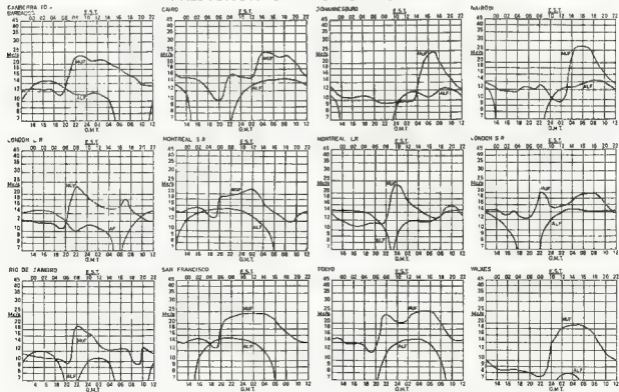
At the June meeting the committee considered correspondence from VK2 ZAD, 8AP5, 2ZTM, 2ZVC, 3JUG, 3AH7, 3ACS, 8AG, 6DA, 6E1. Technical articles were received from VK2 ZSA, 13, 3KY, 3ZRY, 4AT and WAWL. A number of these letters were in response to our request for comments on the Prediction Chart, and steps are being taken to comply with the suggestions received.

The Circulation Manager reported that mass deletions have been received from VK2 VK3 and VK4 who have deleted all non-fraternal members in their mailing lists. These deletions will take effect with the August issue of "A.R." The committee decided that only sufficient copies of August "A.R." to meet orders will be printed, hence there will be no copies available for anybody who misses out through non-payment of subs.

Further consideration was given to the Card Book, and size and format agreed upon. A date for publication has been tentatively set subject to arranging with the printer. A date by which copy will be required. When this aspect is finished all Divisional Secretaries will be advised by mail, with a request to send us firm orders.

Some notes have not arrived at the copy date and have therefore been omitted. All contributors are reminded that copy date as from now is the 30th of the month, notes arriving after the 30th will be either held for the following month or omitted at the contributor's wishes provided we are advised in time what action is desired.

PREDICTION CHARTS FOR JULY 1966



(Prediction Charts by courtesy of Ionospheric Prediction Service)

NEW CALL SIGNS

MARCH, 1966

VK1TW—T. Wooley, 41 Nicholson Cres., Turner.
VK1WV—C. H. Armstrong (Sgd Ldr.), 11 Plunkett St., Chifley.
VK2BZ—R. B. Christensen, "Landown," 11 Manua Ave., Neutral Bay.
VK2ZHT—G. D. Armstrong, 23 Herring Rd., Milwood.
VK2ZU—E. R. Rogers, 17 Empire St., Haberfield.
VK2ZF—R. F. W. Boudry, Station: 25 Russell Ave., Highfields, Postal: P.O. Box 385, Newcastle West.
VK2ZHR—P. Halpin, 19 Morton St., Waverton.
VK2ZY—C. L. Vandell, 44 Onslow St., Rose Bay.
VK2ZL—W. C. L. Wylie, 55 O'Sullivan Rd., Leumeah.
VK2PO—P. L. Brentwood, 14 Lella Rd., Ormond.
VK3VX—A. G. Pither, 3 Riverdale Court, Hawthorn.
VK3AHX—A. L. H. Klassik, Kyvalley, via Tongala.
VK3AJ—J. A. Boell, 6 Willis St., Deepdene.
VK3AID—W. G. Dunn, 44 Carrethool St., Bulmer.
VK3ATN—R. B. Knaggs, Wangaratta South.
VK3AKM—J. F. Patrick, 18 Loch St., Camberwell.
VK3ALO—A. L. Lowe, Broadway, Wycheproof.
VK3AMK—G. J. Wilson, 7 Norman Ave., Frankston.
VK3AMI—A. P. Sanderson, 25 Park St., Elsternwick.
VK3AOP—A. G. Boell, "Wang," Stradbroke Ave., Cowes.
VK3APU—J. C. Gultcher, 17 Foulds Court, Montrose.
VK3APZ—K. Glade, 292 Barkly St., Elwood.
VK3AZC—G. M. Campbell, 37 Essex Rd., Surrey Hills.
VK3AZE—E. Stribling, Armvige St., Lorne.
VK3ZAO—R. A. Bailey, 25 Frederick St., Balwyn.
VK3ZFP—O. F. Fudges, 7 Emma St., Caulfield.
VK3ZG—J. Williams, 38 Thomas St., Noble Park.
VK3ZQG—A. Athans, 1381 Malvern Rd., Malvern.
VK3ZQH—R. F. Frost, 690 Whitehorse Rd., Mitcham.
VK3ZRO—A. G. Birch, 5 Harrison St., Bendigo.
VK3ZTF—J. F. Fitzherbert, Station: 108 Raglan St., Ballarat South; Postal: Maintenance Squadron, R.A.A.F. Base, East Sale.
VK3ZTL—F. D. McKenzie, Flat 2, 3 Mayfield Ave., Malvern.
VK3ZTK—K. G. Middleton, 18a Charnman Rd., Montone.
VK3ZTW—R. B. Adderley, 16 Grants Rd., Fawkner.
VK3ZTX—R. J. F. Bruhn, 54 Warrigal Rd., Surrey Hills.
VK3ZUP—W. Russell, 33 Irwin Ave., Wangaratta.
VK3ZUT—N. D. Miford, 197 Liberty Par., West Heidelberg.
VK3ZVI—Wireless Institute of Australia, Victorian Div., 476 Victoria Parade, East Melbourne.
VK3ZX—R. G. Leth, 27 Marjorie Ave., Belmont, Geelong.
VK3ZVA—R. D. Young, 28 Walbundry Ave., North Warragul.
VK3ZAP—M. Lake, Lower Fisher St., Thorneside.
VK4GR—Ipawich Grammar School Radio Club, C/o J. L. Boguda, Ipawich Grammar School, Ipawich.
VK4LU—P. H. Long, 63 Eyre St., North Ward, Townsville.
VK4NK—D. J. Sparks, 23 Johnston St., Bundaberg.
VK4VZ—E. J. W. Willis, 37 Pelham St., Coorparoo.
VK4XZ—W. G. Sebbena, Station: 53 Moaman St., Charters Towers; Postal: P.O. Box 187, Charters Towers.
VK4ZN—W. M. Bryce, 9 Raymond St., North Ipswich.
VK4ZTR—P. E. Roden, 19 Livermore St., Rockhampton.
VK4ZLS—A. L. Stehn, 219 Alma St., Rockhampton.
VK4ZW—Wireless Institute of Australia, Qld. Div. Station: 54 Bishop St., St. Lucia; Postal: Box 62, C.P.O., Brisbane.
VK4ZV—J. J. Mount, 19 Edgecombe St., Elizabeth Field.
VK4ZQ—M. S. Fradley, 203 Wright Rd., Valley View.
VK4ZEB—L. A. Bull, 5 Berry Court, Klemzig.
VK4ZTP—J. J. Champion, 58 Victor Cres., Woodville West.
VK4ZLK—R. J. Kampshroter, 23 Sea View Gr., Blair Athol.
VK4ZK—R. F. Keegan, 36 Kingsland Ave., City Beach.

VK4JF—J. C. Flower, Station: Portlaid; Postal: C/o Goldfield Broadcasting Ltd., P.O. Box 40, Kalgoolie.
VK4LC—R. E. Earle, 84 Evansdale St., Floreat Park.
VK4VE—D. A. Benson, Western Mining Corp. Ltd., Laverton.
VK4ZAO—D. A. Mendawcroft, 17a Swan View Terr., Maylands.
VK4ZDD—W. G. Dowie, 19 Sadler St., Subiaco.
VK4ZDU—J. Treanor, Station: Portlaid, C/o Ray Geophysics, 273 Hay St., Perth.
VK4ZK—K. R. D'Arcy, 344 Oxford St., Leederville.
VK4ZPV—D. V. Pryce, 34 Ragot Rd., Subiaco.
VK4ZDJ—B. J. Riddell, 33 Ruwena Rd., Monington Bay.
VK4ZL—T. R. Briggs, 18 Melbourne St., Laureston.
VK4SD—D. B. Wilson, C/o S.I.L. Ukarampe, Queensland.
VK4ZAW—A. J. Watson, Christmas Island, Indian Ocean.

APRIL, 1966

VK1CL—C. E. McLachlan, 23 Cockburn St., Curtin.
VK1DZ—D. H. Watkins, 78 Captain Cook Cres., Grubbs.
VK1ZAB—G. W. Fletcher, Hotel Acton, Canberra.
VK1ZAC—R. Hawkins, 811 Kiwla St., Albury.
VK1ZACS—H. J. Gale, 2 Kosta Close, St. Ives.
VK1ZFP—C. Barnard, 87 Starling St., Dubbo.
VK1ZFN—N. Fiori, 171 Victoria Rd., Punchbowl.
VK1ZON—E. E. Gehlen, Haringal Hotel, Crinella.
VK1ZG—O. L. Post, 38 Rutherford St., Blacktown.
VK1ZJ—W. O'Toole, 78 Gordon Grove Par., Adamstown Heights.
VK1ZKH—K. M. Pletcher, 11 Milton St., Lismore Heights.
VK1ZKR—R. Mudie, 413 Mona Vale Rd., St. Ives.
VK1ZAE—G. A. Stevens, 23 Kilberton Cres., W. Heidelberg.
VK1ZQJ—P. J. Jacquemin (recorded as VK1ZQJ December, 1965).
VK1ZUD—R. J. Woon, 18 Michigan Ave., Corio.
VK1ZVY—W. Yates, 35 Henry St., Highbury.
VK4AT—A. J. C. Thompson, Skyring Creek, Pomona.

VK4FA—D. W. Amussen, 2 Raffles St. Mt. Gravatt.
VK4FS—R. J. Lingham, 183 Margate St., Mt. Gravatt.
VK4NW—P. J. L. Woonough, 30 Wharf St., Shorncliffe.
VK4ZPE—P. E. Tomlinson, 38 Lavender St., Inala.
VK4ZRS—J. J. Hudson, 19 Sydney St., Eagle Junction.
VK4ZWC—W. E. G. Cockburn, 8 Sackett St., Westland.
VK5WA—N. A. R. Wilson, 40 Wellington Sq., North Adelaide.
VK5YB—B. A. White, Station: Portlaid, Postal: Box 228, Keith, Post Office.
VK5ZAW—A. C. Wohlforth, 3 Sandilands St., Lockleys.
VK5ZLG—G. J. Leedham, 14 Glyde St., Albert Park.
VK5WQ—W. M. F. Wattelworth, 43 Devon Rd., Essendon.
VK5ZFP—B. W. Ward, 158 Ardross St., Mt. Pleasant.
VK7TK—A. J. H. Kendrick, 139 Flagstaff Gully Rd., Belvoir.
VK7TM—T. J. Cox, 108 Hampden Rd., Hobart.
VK7ZFM—F. Richeime, 131 Emmett St., Smithton.
VK7ZPT—P. R. Tompson, 13 Richardson St., Dynnville.
VK8JS—S. B. Stacy, P.O. Box 23, Mt. Hagen, T.F.N.G.

☆

V.E.R.O.N. (NETHERLANDS)

P.A.C.C. AWARD

Applicants must offer proof of contact with 100 different P.A.P.C.S. stations.
Normally QSL cards plus 5 IRCs are required but a contest log in the annual P.A.C.C. Contest will count towards the award if the number of QSLs held plus the number of different, completed P.A.P.C.S. QSLs claimed in the contest log add up to 100 V.E.R.O.N. will accept the log entries as proof of contact by cross checking with the local stations.
QSLs, contest logs and the 5 IRCs should be sent to V.E.R.O.N. T.F.N.G., P.O. Box 3, Amsterdam, The Netherlands.
Endorsements are available for 250 and 300 different P.A.C.C. stations worked (P.A.C.C.—250 and P.A.C.C.—300).

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100 Kc. and 1000 Kc. Frequency Standard,

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AUDIO AND ULTRASONIC CRYSTALS—Prices on application.
455 Kc. Filter Crystals, vacuum mounted, £6/10/6 each plus 12½% Sales Tax.
ALSO AMATEUR TYPE CRYSTALS—3.5 AND 7 Mc. BAND.

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Amateur—from £3 each, plus 12½% Sales Tax.
Regids—Commercial £1/10/6, Commercial £1/17/6.

CRYSTALS FOR TAXI AND BUSH FIRE SETS ALSO AVAILABLE.

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LOT 6, EILEEN ROAD, CLAYTON, VIC. Phone 546-0576

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SOUTH AUSTRALIA

Activity during the last month has not by any means stimulated the writer of these notes to launch into any enthusiastic acclaim on behalf of the VK5 v.h.f. fraternity. Whether new equipment is under construction or just plain business has set in, remain an unknown quantity. Nonetheless it is an extremely gratifyingly substantial group from a few members of the "old gang." Bob 5ZDX and Mick 5ZDR, it could be said that 5 and 8 in VK5 is deserved to be expected to say two or three sentences so this can easily be substantiated. Now about it follows, please provide some activity so that I can provide an interesting cover of VK5 activity.

However, all is not lost as the t.v. group has really been upholding our reputation. Using initiative and enthusiasm the group recently imported the essential components required to construct a colour television receiver. Naturally the equipment has been burnt, so much so, that the receiver was completed, aligned and receiving a simulated colour transmission in the shortest of time. Although the writer has not personally witnessed the results of the group efforts he has been led to believe the receiver is a marvel to behold, not unlike the cockpit of a Boeing 747 jetliner. Regardless of looks the results achieved so far have realised great expectations for the future. Unfortunately, the hopes of a VHF satellite transmission on 433 megacycles has been dashed as strict laws governing this type of transmission both commercially and on the Amateur bands have prevented any move in this direction.

Nonetheless, undaunted and showing the true Amateur spirit the group are preparing a

camera to provide a closed circuit colour t.v. system. Although this could well be expected to be impossible for a single person to undertake a similar project successfully, this group has shown how simple it is to accomplish and can be sorted out by pulling together and working as a team. Congratulations fellows!

73 Colin 5ZJH.

WESTERN AUSTRALIA

Amateurs in W.A. were given good publicity as when the Western Australian group in May when Don VKIHK, Harry VKOPB and Graham VK6ZDB were featured tuning up the equipment to receive "Easa," the American Weather Satellite. They used aerial v.h.f. technique but the picturegram unit available used a 1200 cps motor and as the audio tone from the station was 1000 cps some modification had to be made. The system used was to divide 1020 cps. down to 60 cps. by standard means but multiplying to 1200 cps. and then dividing to 1200 cps. and amplifying a total of ten tubes was used. The quality of the pictures was quite acceptable and one was shown over the local t.v. station TVM. Interest in the receiving method used has been shown by the local weather bureau.

There was a field day on 22nd May and several stations were 5ZDD on Mt. Solus, 5ZDZ on Mt. William and 5LX on Mt. Wellington as well as s.a.b. in the morning and portable on s.m. in the afternoon. Several new stations were active and it is hoped that more can be expected on in the near future.

Viv 5ZCM had a coronary thrombosis about the middle of May and has a couple of months' sick leave ahead. HZAG.

PROJECT OSCAR

Editor "A.R." Dear Sir,

Oscar H.Q. are anxious to know whether there have been any reports of the Oscar IV beacon being heard in VK since 10th April. There have been no reports in VK for several months. If anybody has heard the satellite since 10th April, please let me know as soon as possible. I am afraid that we cannot provide any critical data on Oscar IV—we have had none from Project Oscar for several months. At last report, Oscar IV was still operating erratically, with the beacon cutting into the translator passband every few seconds. Interest in the satellite seems to have died now that there has been no apparent hope of the beacon fault being corrected. However, if any interested operators want orbital data on Oscar IV, please let us know, and we will do our best to get hold of some from Norad.

—Richard Tonkin, Chairman, Project Australia Liaison Committee.

PIRATING OF VKI CALL SIGNS

Editor "A.R." Dear Sir,

During the last three years a vast number of QSL cards have arrived and are still arriving at the Canberra Radio Society for stations with QSL call signs which have never been issued by the licensing authority.

A check of the hundreds of cards received shows no less than 10 different illegal call signs. Some of these cards show the stations that while Pacific area stations have strong signal reports to be some of the illegal transmitters, indicating that they may be operating in the Pacific area. Some have received signals of 58 or 59 signals from European and U.S.A. stations. The indications are that a VKI call sign is popular amongst illicit operators around the world.

The actual number of licensed stations in the Australian Capital Territory is currently 61, of which only about a dozen are active on the h.f. bands with any regularity. It is therefore clear that there are one and a half times more illegal VKI's than legal ones.

All stations are urged to treat with caution all contacts with VKI stations whose calls do not appear in the latest Call Book, but allowing for the possibility of newly issued C or I signs.

J. Westerber, VKIQJ, Secretary, Canberra Radio Society.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

TOUR OF AUSTRALIA

Editor "A.R." Dear Sir,

During July and August next I expect to be on a tour of a large part of Australia and should be operating portable and mobile s.a.b. in VK5 and 6. I am going to VK6A. The call sign will be VKUJL with the appropriate signal and the main operating frequencies will be 3.675, 7.075, 14.125 and 14.210 Mcs. or near each of these.

Times of operation will not be very regular but should be generally around local times of s.m., 1 p.m. and in the evenings on the most suitable band for the time, conditions, etc.

A rough idea of locations and dates is: Melbourne to Port Augusta: July 2, 3, 4. Port Augusta to Alice Springs (on train, no operation).

Alice Springs to Ayre's Rock, etc.: July 6 to 8. Alice Springs to Darwin: July 15 to 20. Darwin to Townsville and Cairns: July 21 to 24.

Cairns to Melbourne: August 7 to August 31. I hope to have as many contacts as time will permit and a special QSL card is being prepared and will be sent to all stations contacted, also s.w.l.s. who may report and request same.

—Andy Roudie, VKAUJ

ILLUMINATE ACTIVE HARRY

Editor "A.R." Dear Sir,

It has occurred to me that it would be very interesting to know who it was that was the first licensed Amateur transmitter in the world.

In Western Australia we have a candidate for the title of first person to set up a radio and life member of the West Australian Division of the Wireless Institute of Australia, VKWVS, who was the 18th of July next will be 82 years of age.

William Schofield, of 40 Irvine St., Pepper-mint Grove, West Australia, VKWVS, was active on the lower frequencies from 1900 to 1962, except for the war years, and was well known in most parts of the world as Skipper.

He became blind and had to cease operating on the lower frequencies but is still operating on the 30 Mc. band with a few others. He is in quite good health and his brain is as active as ever.

I would be very interested to have your views on my suggestion.

—W. E. Coxon VK6AG.

Sub-Editor: CYRIL MAUDE, VK3ZK.
2 Elderton St. Avondale Heights, W.2, Vic.

Well news time has come around again and I would like to thank all those who sent in their notes early and specia. thanks to Colin VK4ZHR for his neatly printed notes. Activity on the bands have been varied with openings on 2 metres and a new 433 Mc record.

VICTORIA

Activity on both 6 and 2 metres has been poor except, for Sunday, 29th May, when 2 metres had a five-hour opening to Adelaide and S.A., in general, at the same time some were trying 433 Mc. Ian VK3ALZ and Mick VK4ZDR made two-way contact on 433 Mc. 5 x 7 for what could be a new record for VK. As for 2 metres, among stations heard were JRO, 5ZDR, 5BC, 5ZMJ 5KMK and 5ZC Bill 5ZDC claims that he also heard 5ZDR and 5NN. John 5ZDK states that he has heard and worked many VK5 over the past month on 2 metres and the following Melbourne stations on 433 Mc. 5ALZ, 5AUK, 5ZPG, 5ZBB and 5ZSJ. John 5RP ex-5ZHR and Col 5ZKX have equipment in operating condition for 433 Mc. John continues, all this goes to prove that good VK activity is going on in the winter month and the active stations are fully rewarded.

The VK5 v.h.f. group is planning a convention over the next weekend, 30th and 31st October, 1968. A committee has been formed and now making preliminary arrangements. Anyone with suggestions to help this convention to be the best VK3 convention ever, write to the V.H.F. Convention Secretary, P.O. Box 26, East Melbourne, Victoria. The only other activity on 2 metres was a group of VK5 working on the structure of the Institute, F.E. P.C. and 5LX. The VK5 group are aware of the problems the Institute has been working on to assist Amateurs.

The other two activities being the scramble on 2 metres and the second Fox Hunt, each held on 2045 hrs. and the 2 metre Fox Hunt held on the 4th Wednesday of each month at 2000 hrs. 73, Cyril 5ZCK.

QUEENSLAND

Very little of interest has taken place, apart from the 6 metres Fox Hunts 2 metres is a dead loss for mobiles, even for home stations. With the approach of the winter months the usual decline in activity has taken place. In the past it was thought that during the cold months television was the main attraction, however, from certain observations, it seems clear that this is not the case. Soldering irons are busy in most shops rebuilding equipment for use in the summer months. There are at least two new 150 w. transmitters nearly ready to be air tested. While on the subject there is a certain speech clipper-filter being used around town which apparently hasn't had a rebuild since it was made two years ago. While its original bandwidth was 300-500 cycles, its bandwidth ten years later has changed to 300-500 cycles.

Of some importance is the news that transmitter hunts have again been organised. As 2 metre mobile gear is very rare and as just about everyone has 6 metre mobile gear, 6 metres was the band that was chosen for 2 or 4 element loaded beams or a JLF loop are used to locate the hidden transmitter. An important departure from the traditional 2 metre procedure is that the operator of the hidden TX periodically conducts a "call in" of all cars periodically, who are not to be seen.

Some interesting contacts have occurred in the last month, VK6ZTW has been active from Tewantin working into Brisbane on Sunday mornings over 6 metres. George VK4DX ex-VK4ZTW has been working Radio Shack 2045 hrs. is back on the bands after a long absence, working VK4SI and VK4PU in Woombye. ALKO has been active on 2 metres. The 6 kw 6 metre Ham station on the hill, Ray VK4ZMR and Lloyd VK4ZLO both worked over the 6 metre band from Brisbane, were enjoying a short holiday on the Gold Coast. Ross VK4ZAT has been active from Brisbane Island on 2 metres. Tom 5ZKX VK4ZAL has not been heard since 6 metre VK4Q began transmission. 73, Peter 5ZPL.



NEW AWARDS. The R-150-C. For verifications from 150 countries of which 15 are countries of the U.S.S.R. These must be for QSOs after June 1, 1960, and all phone or all c.w. not mixed. UNI is counted as UAI. Send a certified list of QSOs (that is a list certified by a radio club or the W.I.A. manager) to Central Radio Club, Box 98, Moscow, U.S.S.R. There is no charge. "Monitor"

QUERY CORNER. Bill Jehn, QTH of OXJY is via BMTAC. Ernie Luff would like information on any U.S. Swl awards. Wanted, loan of a copy of either June 1953 or June 1954 "A.R." which contains the article on the "like new" mixer for the AR7 Rx. This is required to modify my own Rx to the circuit supplied by 4UC. Bryan Prosser L0058 is looking for tape psis.

| | 1999 | 2000 | 2001 |
|--------------------|-------|-------|-------|
| 1. Total | 100.0 | 100.0 | 100.0 |
| 2. Government | 100.0 | 100.0 | 100.0 |
| 3. Non-government | 100.0 | 100.0 | 100.0 |
| 4. Total | 100.0 | 100.0 | 100.0 |
| 5. Government | 100.0 | 100.0 | 100.0 |
| 6. Non-government | 100.0 | 100.0 | 100.0 |
| 7. Total | 100.0 | 100.0 | 100.0 |
| 8. Government | 100.0 | 100.0 | 100.0 |
| 9. Non-government | 100.0 | 100.0 | 100.0 |
| 10. Total | 100.0 | 100.0 | 100.0 |
| 11. Government | 100.0 | 100.0 | 100.0 |
| 12. Non-government | 100.0 | 100.0 | 100.0 |
| 13. Total | 100.0 | 100.0 | 100.0 |
| 14. Government | 100.0 | 100.0 | 100.0 |
| 15. Non-government | 100.0 | 100.0 | 100.0 |
| 16. Total | 100.0 | 100.0 | 100.0 |
| 17. Government | 100.0 | 100.0 | 100.0 |
| 18. Non-government | 100.0 | 100.0 | 100.0 |
| 19. Total | 100.0 | 100.0 | 100.0 |
| 20. Government | 100.0 | 100.0 | 100.0 |
| 21. Non-government | 100.0 | 100.0 | 100.0 |
| 22. Total | 100.0 | 100.0 | 100.0 |
| 23. Government | 100.0 | 100.0 | 100.0 |
| 24. Non-government | 100.0 | 100.0 | 100.0 |
| 25. Total | 100.0 | 100.0 | 100.0 |
| 26. Government | 100.0 | 100.0 | 100.0 |
| 27. Non-government | 100.0 | 100.0 | 100.0 |
| 28. Total | 100.0 | 100.0 | 100.0 |
| 29. Government | 100.0 | 100.0 | 100.0 |
| 30. Non-government | 100.0 | 100.0 | 100.0 |
| 31. Total | 100.0 | 100.0 | 100.0 |
| 32. Government | 100.0 | 100.0 | 100.0 |
| 33. Non-government | 100.0 | 100.0 | 100.0 |
| 34. Total | 100.0 | 100.0 | 100.0 |
| 35. Government | 100.0 | 100.0 | 100.0 |
| 36. Non-government | 100.0 | 100.0 | 100.0 |
| 37. Total | 100.0 | 100.0 | 100.0 |
| 38. Government | 100.0 | 100.0 | 100.0 |
| 39. Non-government | 100.0 | 100.0 | 100.0 |
| 40. Total | 100.0 | 100.0 | 100.0 |
| 41. Government | 100.0 | 100.0 | 100.0 |
| 42. Non-government | 100.0 | 100.0 | 100.0 |
| 43. Total | 100.0 | 100.0 | 100.0 |
| 44. Government | 100.0 | 100.0 | 100.0 |
| 45. Non-government | 100.0 | 100.0 | 100.0 |
| 46. Total | 100.0 | 100.0 | 100.0 |
| 47. Government | 100.0 | 100.0 | 100.0 |
| 48. Non-government | 100.0 | 100.0 | 100.0 |
| 49. Total | 100.0 | 100.0 | 100.0 |
| 50. Government | 100.0 | 100.0 | 100.0 |
| 51. Non-government | 100.0 | 100.0 | 100.0 |
| 52. Total | 100.0 | 100.0 | 100.0 |
| 53. Government | 100.0 | 100.0 | 100.0 |
| 54. Non-government | 100.0 | 100.0 | 100.0 |
| 55. Total | 100.0 | 100.0 | 100.0 |
| 56. Government | 100.0 | 100.0 | 100.0 |
| 57. Non-government | 100.0 | 100.0 | 100.0 |
| 58. Total | 100.0 | 100.0 | 100.0 |
| 59. Government | 100.0 | 100.0 | 100.0 |
| 60. Non-government | 100.0 | 100.0 | 100.0 |
| 61. Total | 100.0 | 100.0 | 100.0 |
| 62. Government | 100.0 | 100.0 | 100.0 |
| 63. Non-government | 100.0 | 100.0 | 100.0 |
| 64. Total | 100.0 | 100.0 | 100.0 |
| 65. Government | 100.0 | 100.0 | 100.0 |
| 66. Non-government | 100.0 | 100.0 | 100.0 |
| 67. Total | 100.0 | 100.0 | 100.0 |
| 68. Government | 100.0 | 100.0 | 100.0 |
| 69. Non-government | 100.0 | 100.0 | 100.0 |
| 70. Total | 100.0 | 100.0 | 100.0 |
| 71. Government | 100.0 | 100.0 | 100.0 |
| 72. Non-government | 100.0 | 100.0 | 100.0 |
| 73. Total | 100.0 | 100.0 | 100.0 |
| 74. Government | 100.0 | 100.0 | 100.0 |
| 75. Non-government | 100.0 | 100.0 | 100.0 |
| 76. Total | 100.0 | 100.0 | 100.0 |
| 77. Government | 100.0 | 100.0 | 100.0 |
| 78. Non-government | 100.0 | 100.0 | 100.0 |
| 79. Total | 100.0 | 100.0 | 100.0 |
| 80. Government | 100.0 | 100.0 | 100.0 |
| 81. Non-government | 100.0 | | |

Amateur Radio, July, 1966



FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL

The first meeting of the new Federal Executive for 1966 was held on the 18th May and the President, Mr. Max Hull, welcomed David Wardlaw to the meeting.

Amongst the correspondence was a letter from VKIACU Hans Ruckert, who was going to Germany in May and amongst other things was attending a convention of the D.A.R.C. Hans was given the authority to address the convention and convey the greetings of Australian Amateurs to those in Germany and we are looking forward to his report when he returns.

The Boy Scouts' Association also wrote announcing the Jamboree on the Air for 1966 and once again the Institute has assured the Association of its support for this very important occasion.

The President wishes to place on record the superlative way in which the Queensland Division conducted the Federal Convention at Easter. It was a most successful convention and all those attending have nothing but praise for the way the VKs organised accommodation, catering and the general paraphernalia which goes with the running of a convention.

More recent activities have been the compilation of the minutes and the President and Vice-President Harold Hepburn have completed this task and, by the time this is read, copies of the minutes will be in all Federal Councillors' hands.

Early in May Harold Nepburn, Kevin Connolly and Peter Williams attended the final meeting with the P.M.C. Officers dealing with the revision of the Handbook. All outstanding matters have been resolved and it is expected that the next issue of A.R. will contain a full statement of proposed changes, and of special interest to A.I. will be single sideband measurement, portable and mobile operation and many other matters.

One of the most important matters before the Executive is concerned in the organization of the machinery necessary to write letters and provide all Divisions with the information that they should receive. Following the Federal Convention, Federal Council authorized the purchase of two Dictating Machines, the first being for the Executive and will in no small way alleviate the mechanical work which has in the past and in the immediate present taken up so much of Executive's time. Executive by doing this will therefore be able to devote more time to the future of the League, to the study of many different directions and, all in all, we look forward to a year of great progress.

Actions taken as a result of motions passed at the last Convention will be reported in these columns when the States have ratified the minutes.

FEDERAL OSL BUREAU

CX2AJ, Enzo Sommaruga, Box 122 Montevideo, Uruguay, forwarding QSLs, states he has not yet received a single VK card and solicits my help. Do not let me down.

The city of Rio de Janeiro, Portugal, has sponsored an award for world Hams who connect two stations in that city after 1st January, 1965. Any band, any mode. Claims to be sent to: Comissão Municipal de Turismo, Aveiro, Portugal, accompanied by the two QSLs which with award will be returned free of charge. Aveiro stations are CT1C/M, G1, H1, I1, J1, L1, M1, N1, O1, P1, Q1, R1, S1, T1, U1, V1, W1, X1, Y1, Z1.

The following change in the A.R.R.L. QSL Bureau list, effective immediately, is: K1.7, Alaska QSL Bureau, Star Route C, Wasilla, Alaska.

For those despondent about non-receipt of QSLs, the following sighting is quoted: To VK3OF from K2EPP confirming 14 Mc. c.w. QSO on 8th Nov., 1936!

Cards through the Federal Bureau have average 7000 each month of 1965.

—Ray E. Jones, VK3RJ, Manager.

NEW SOUTH WALES

The lecture for the VKS Division's monthly meeting at Wireless Institute Centre on Friday evening, 27th May, was a most interesting one—a combination of talk, demonstration of equipment and colour slides. The large attendance showed its appreciation by close attention during the lecture and asking several

John Fetherstone, WSRPL, from Tucson, Arizona, has lectured and he chose a somewhat unusual subject, "New Thoughts in Audio Communications." John is a Master of Engineering, has lectured at a number of universities and is widely travelled, so it was small wonder that the audience enjoyed what he had to impart. At the present time he is carrying out further investigations into h.f. communications at the

The equipment on display included generators of high-speed c.w. and gave forth some of the queer noises that we have often heard in the h.f. bands. The speeds ranged from

The colour slides gave very clear views of equipment and installations in America, England and Australia.

Chairman Tom ZOD called on Bob Leigh KH8COZ, a visitor from Honolulu, to deal with the vote of thanks to the lecturer.

Further highlights of the meeting were two presentations to members of our Youth Radio Scheme, Ern Chaliker and Greg Dunne. The latter's parents accompanied him to the meeting and were given a welcome.

Mr. Thatcher, of the Overseas Telecommunications Commission, presented a book donated by GTC to Ern Chalker, who was the first member of a V.E.S. Postal Group to gain the L.A.O.C.P. In offering his congratulations, Mr. Thatcher informed the gathering that Ern had not only made electronics a hobby but was making it his vocation by entering the employ of G.T.C.

Greg Dunne with a prize of a soldering iron, which was one of those generously donated to the Y.R.S. in each Division by Mr. A. L. Roylison, of Adcoils Products, Melbourne. Greg has been doing excellent work as a pupil of Kingsgrove High School, and was the first

The QSL Officer, Sld 250, said that during his recent absence on holidays the Bureau had been well looked after by Ted 2ACD and his daughter, who between them had handled 3800 cards for the month.

The Federal Councillor, Pierce ZAPQ, said that satisfactory progress was being made with the minutes of the recent Federal Convention held in Brisbane. The Australls satellite project was proceeding well. In connection with the latter, the President reported that Divisional Council has made an immediate progress payment of \$30 towards the preliminary work that must be carried out prior to the launch.

The Supervisor of the Youth Radio Scheme, Rex Black FFA reported that a quantity of Fairchild translations had been received and had been distributed to senior pupils of the Y.R.S. There were now 35 clubs, the latest being the Police Boys' Club at Bankstown. Rex also gave a resume of a function held recently at Kingsgrove High School, where Greg Dunne had been the recipient of a book at a full assembly of the school.

The President informed the meeting that during the previous week someone had broken into the Division's transmitting station at Dural, and had stolen two ART receivers, three coil boxes and a power supply. The matter was in the hands of the Parametia police. In the meantime, members were warned to take the necessary precautions before purchasing any ART receivers that may be offered for sale.

Divisional Council has appointed Stan Doggen IZRD to fill the vacancy caused by the resignation of Maurice Marsden IVV. However, at the moment Council is still one down, with the resignation of Kev Collins 2ANY.

Cyril Henderson 2CH and Vince O'Donnell 2ZOD are recent welcome additions to the Dural engineers' panel.

Congratulations to Alan Smith, of the Blue Mountains Branch, who recently gained the L.A.O.C.P

One does not usually associate Amateur Radio with rifle shooting. However, George ZAZE (Kurnell George) manages to mix these two interests quite nicely. By all accounts he gives the bull's-eye a bit of a pasting most times.

Council members were pleased recently when a few donations arrived in the mail for the I.T.U. Fund, but VK2 is still a long way short of its quota and all those who so far have not "kicked in" are urged to do so without delay. It will be too late after our bands have been whittled down again.

The VK2 W.C.E.N. Committee continues to meet regularly each month, and the recent election of officers for the ensuing twelve months resulted as follows:—

Chairman, Keith Finney 2KJ; Secretary, Barry White 2AAB; Treasurer, Don Millener 2GN, Committee Bruce Meldrum 2ZOT, Dave Downie 2ZED, Brian Hall 2ZOW, Peter Campbell 2AXJ, Paul Doman 2ZPD. Technical, Communications and Zone Co-ordinators have yet to be appointed.

Clinics for f.m. carphones on the 146 Mc. Net were held at Wireless Institute Centre in April and May and a further session was set down for June. Some high quality test equipment was made available for these clinics and the following were checked and adjusted where necessary: Transmitter—Frequency, deviation and audio distortion, power output. Receiver—Quieting figure, netting to transmitter.

A booklet outlining message handling procedure has been printed. This is a direct copy of that used by the VKS Division, which has been fully tested under exacting conditions. Copies may be obtained from the W.I.C.E.N. Secretary, Barry White 2AAB or Wireless Institute Centre, Crows Nest, 73, Ivan VK3AIM.

HUNTER BEANCE

Those members intending to go mobile were well catered for at the June meeting of the Branch held on 3rd at the Technical College. The first lecturer was Len ZYFD, who gave a host of useful information about suppressing radio interference. He introduced a number of members to a new technique using ferrite beads on the plug leads right at the spark plug. Those who have used this method have reported that it is superior to the former method of fitting a 15K resistor in the ignition coil. Len also gave a demonstration of a capacitor for dynamo suppression but frightened many off when he mentioned the price.

Then followed the "Converters" lecture, delivered by Ian ZELF. Ian discussed the problems of designing a converter to suit the local conditions of the user and went into detail to speak about valve and transformer front ends and mixers. Following an extensive treatment of operating parameters and design considerations, Ian discussed his own design of a converter using a pair of nuvistor valves in grounded grid. This and all the other photostatic handouts are members of the subject's handbook or manual or course.

SILENT KEY

It is with deep regret that we record the passing of:

VK3AS—A. Stow.
VK3SA L. Simpson.

present and Bill ZZWMM in his vote of thanks to the lecturers expressed the appreciation of the members when he referred to the courses as being a most worthwhile contribution. The W.I.C.R.N. handbook of operating procedure was available and Gordon ZZZG arranged a distribution of these. The attention of members was drawn to the fact that a suspected pirate is operating in the area. It was suggested that this person be shown the error of his ways in some suitable fashion before he lands himself and others into trouble. One unhappy member is John that is kept performing for other services by them is frequently blamed on licensed members. Almost invariably they are not allowed to press their case as "Radio Amateurs" thus bringing discredit on legitimate Amateurs operating within the terms of their license.

Some members have already received the new licence renewal card being issued by the Post Office. This takes the same form as the computer based licences or viewers' licences. One rather strange thing is, however, that no call sign is stated on the card. Although a note in bold type on the reverse side indicates that payment may only be made to the Chief Cashier, I paid mine at the local Post Office without any argument.

The attention of members is drawn to the local broadcast of news which is made from VKAWX every Monday night at 1900 Eastern Time. This broadcast is for members and it cannot be missed without your support. Every effort should be made to call back after the broadcast and comment on the subject matter. The broadcast is made from the Westlakes Radio Club building at Terahs and members are cordially invited to be present. It is a great opportunity for those who desire may wish to volunteer to read or prepare the script and this would be greatly appreciated by those at present maintaining this service.

After hearing reports that his signal was only 89 instead of off the scale, Jim ZANT decided to tell something about it. He stated that this was his 40 metre signal, so, equipped with a rotatable beam for this band he went to the park and checked the already existing full 80 feet and supported the new 7 meg. radiator stop it. This now gives Jim the distinction of being one of the strongest stations on the 40m band which is already evident on his other h.f. band operation. Jim now has separate beams for bands 40 to 10 and, feeling that conditions were already good on the other day, I'm expecting 80 to be the next band of consideration. His new mast is certainly a masterpiece.

During his recent visit to Newcastle, Don ZBAE did an amount of constructional work and was able to get a transmitter fully operational on the 40m band. He also has a 100 W. 1 m. unit. Of course, the efficiency which accompanied this constructional feat was not as high as could have been expected. Too many cockroaches, no doubt.

While commensurate peddle around among the stars, those on earth have to be content with experiments with a Galaxy—or so Les ZSZ tells me. To make the operation just that much more interesting, he has bought a new chariot to go with it and probably by now is operational on the DX bands. Whether this is an attempt to catch the star of local mobile operators or not I cannot say but for any who may wish to do so here is the help. You are just 89 countries behind scratch—that's Bill's JXT's mobile score at the present. By the way—good news for Les ZSZ's Sylvia, XYL of ZSZ, is allowed to drive the new car—outside the town. Those on 148 L.m. are having their day too. A contact was made this morning between Les ZSZ and Arthur ZZWMM recently Bill ZZWMM and Arthur ZZWMM are both on the way to having the P.T.C. units available soon for 148. Ron ZSZ is planning a new aerial system to really get operational on the DX bands as well as 40 m. and 80 m. Inverted V appears to be his choice, so watch out soon for big signals.

Don't forget the next meeting of the Branch to be held on Friday, 8th August, when another lecture of interest has been arranged. Full details of this meeting and all Hunter Branch activities may be heard on the weekly broadcast—3595 Mondays—or may be read in the weekly column "News of Radio Amateurs," published every Saturday in the Newcastle "Morning Herald." Oh, and you won't get the Field Day, it's less than 3 months away! See you, 73, ZARX.

CENTRAL COAST BRANCH

The last meeting of the Central Coast Branch was held on Friday, May 20. It was a cold, very wet evening, but we had an attendance of 11 to local activity. VKZAKX talk about experiences at the Federal Convention in Brisbane and Tony Mullen VKZCT discuss his transistor converter. It was a most interesting and instructive evening and everyone appreci-

ated the efforts of Keith and Tony to devote their time to us.

We have a new call sign on our district—Peter Kerr VKZPK. 73, Muna VKZAKX.

VICTORIA

VICTORIAN COUNCIL MEETING

The meeting held on 23rd May was the first meeting of the new Council. The new members are John Beckett VKZCZ, John Wilson VKZCQ, and Bill Paul VKZAGZ, who volunteered his services as Treasurer and is therefore an ex-officio member of Council.

The first task undertaken was the shuffling of the many tasks involved in running the Division, and they came out as under—

President: Ken Pincott, VKZAJF.
Vice-Presidents: Michael Owen, VKZJEO, Tom Cuthbertson, VKZJQZ.
Secretary: Ken Seddon, VKZKCS.
Treasurer: Bill Paul, VKZAGZ.
Federal Councillor: Michael Owen, VKZJEO.
Librarian: Bill Roger, VKZJAE.
Instrument Library: Cyril Maude, VKZJCK.
Inwards QSL Manager: Eric Treblecock, VKZAJF.

Outwards QSL Manager: Ivor Stafford VKZKXB.
Disposals Secretary: John Buttrick, VKZKOR.
Disposals Assistant Secretary: Jack Kelleher, VKZAJF.

Disposals Committee: John Spicer, VKZJEL; Tom Cuthbertson, VKZJQZ; Jim Stewart, VKZJES; Len Foynter, VKZJGP.
Broadcast Committee Chairman: John Wilson, VKZJQZ.
Class Instructor (Theory): Cliff Pickering, VKZJTP.
Class Instructor (Code): Jay Lancaster, VKZJL.

Correspondence Course: Ken Seddon, VKZKCS.
Transmitting Officer: Peter Linden, VKZKKB.
W.I.C.R.N. Co-ordinators: John Buttrick, VKZKOR; Michael Owen, VKZJEO.
Technical Co-ordinator: John Spicer, VKZJEL.
State Controller: Harold Hepburn, VKZJAF.
T.V.I. Committee: Jack Taylor, VKZJZF.
Bill Rice, VKZAJF; Mr. Furling, VKZJAF.

Publicity Officer: John Wilson, VKZJQZ.
V.R.S. Liaison Officer: John Buttrick, VKZKOR.
Editor "Amateur Radio": Ken Pincott, VKZAJF.
Assistant Editor: Kel Cocking, VKZJFP.

It was resolved that in order to ensure a continuity of the work of the Division, office-bearers should have an assistant. Any member willing to assist with any of the work is asked to contact the Secretary.

The I.T.U. Fund was discussed and in view of the discussion at the General Meeting it was agreed to publish the list of donations so far received. The list is up to 15/5/68.

£10 VKBs WB, AFW, APC.
£5/4/- VKBs NL, QV, UM, AVY.

£5 VKBs DU, HC, IC, OH, VZ, ADN, AIM, ARK, ASY, AWF, ZYJ, ZME, ZPL.

£3/5/- VKBm J1302.
£3 VKBs BB, CO.
£2/10/- VKBs BM, ABA, ZDP.
£2/- VKBs AS, DG, EJ, HW, NB, AHA, AHZ, ZLR.
£2/1/- VKBACH

£3 VKBs AL, BQ, BS, BT, FH, HJ, HL, HW, IT, KP, MU, NS, PL, QF, VR, VQ, XY, VZ, ZE, ABE, ADN, ADS, ADV, AJW, ALM, AY, AOD, AOG, APM, ARJ, AST, AVX, AWT, AXC, AZA, ZAN, ZBY, ZCF, ZCO, ZER, ZFM, ZGL, ZIG, ZIR, ZJP, ZKN.

VKSM
£1/10/- VKSKK
£1/10/- VKS AN, DV, ES, GB, QX, SO, WM, ADK, APH, APR, AVY, AWW, ZAM, ZXI

£1/10/- VKM AJ, LG, YV, AAC, CAD, ARQ, AKO, ZBU, ZOC.

£1/- VKBs AK, AG, AZ, BJ, BL, BP, BX, CR, CI, CJ, CO, CT, CZ, DM, DQ, DT, EC, EF, EH, EL, EM, EN, EW, FF, FG, GH, HI, HJ, IZ, JA, KB, KC, KD, KE, KF, LG, LF, LI, LW, MI, NJ, NY, PC, PH, PJ, PW, ZG, ZL, QP, QR, RA, RM, RN, RS, RU, TV, UJ, VJ, WK, WY, XB, XC, XM, XN, ZK, ZL, YL, YQ, YS, YU, ZB, ZC, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, 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SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UU, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.

D. Andrews, J. A. Gilmour, R. J. Colander, C. Constable, M. Trainor.

These donations total just under £500 against our state quota of £600. Donations received after the 15th May will be listed and published as they become available.

It was resolved to start a membership drive. Some of the preliminary work has already been done and John Bennett undertook to run this project.

The 1967 State Convention was discussed and a proposition agreed to in principle. Steps will now be taken to check if it is possible to make suitable arrangements, and it is hoped to announce the venue and form of the Convention within a matter of a week or so.

EASTERN ZONE

The duck season is certainly with us, as Reg ZAWY has bragged himself a duck talking machine in the guise of a Galaxy 3. David ZDY must have persuaded him that this was the breed to purchase. Vis ZAWY is tempo-

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Page 21

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| 1A5 | 50c | 5V4G | \$1.79 | 8F3 | 50c | 7N7 | 79c | 954 | 50c |
| 1A10T | \$2.50 | 5Y3 | \$1.38 | 8C6 | 79c | 79T | 50c | 955 | 50c |
| 1C | 50c | 5Y4 | 79c | 8Q4G | \$3.00 | 12A6 | 50c | 956 | 50c |
| 1D4 | 75c | 5Z3 | \$1.75 | 8H6 Metal | 50c | 12A7H | 50c | 958A | \$1.50 |
| 1D6 | 75c | 6A3 | 79c | 4J5GT | \$1.00 | 12A7T | 79c | 1016 | \$1.50 |
| 1F3 | \$1.49 | 6A4 | 79c | 4J5GT | \$1.00 | 12A7U | \$1.50 | 1025 | 50c |
| 1H5 | 75c | 6AB7 | \$1.00 | 6X5 | \$1.00 | 12A7UA | \$1.50 | 1036 | 50c |
| 1K3 | 50c | 6AC7 | 79c | 6X7 | 50c | 12A7V | 79c | 1039 | 50c |
| 1K7 | 50c | 6AG5 | 50c | 6X8GT | \$1.25 | 12B28 | 79c | 1059 | 50c |
| 1L4 | 50c | 6AG7 | \$1.28 | 6X8 Metal | \$2.80 | 12C8 | 50c | 1063 | \$2.50 |
| 1L5 | \$1.50 | 6AJ5 | 79c | 6L7 | 50c | 12C8 | 50c | 1061 | \$1.00 |
| 1L7 | 50c | 6AK5 | \$1.40 | 6BT | 50c | 12S4GT | \$1.50 | 9004 | 50c |
| 1M4 | 50c | 6AL5 | \$1.40 | 6BT | 50c | 12SCT | 79c | E489 | 50c |
| 1M5 | 50c | 6AM5 | \$1.50 | 6B7 | 79c | 12SCT | 79c | EC336 | \$2.50 |
| 1P5 | 50c | 6AM8 | \$1.00 | 6B7 | 79c | 12SCT | 50c | ECR33 | \$2.50 |
| 1Q3 | 50c | 6AN7A | \$1.65 | 6SC7 | 79c | 12SNT | 79c | ECM36 | 75c |
| 1K3 | \$1.69 | 6ARTGT | \$2.10 | 6SF3 | 79c | 12SNT | 50c | EP30 | 50c |
| 1K3 | \$1.75 | 6ASTGT | \$2.00 | 6SF7 | 79c | 12SNT | 50c | EP30 | 50c |
| 1L3 | \$1.80 | 6AU5 | \$1.45 | 6SH7 | 50c | 16A3 | \$1.70 | EY91 | 50c |
| 1T4 | \$1.00 | 6AUS4 | \$2.40 | 6SHT | \$1.25 | 16A3 | \$2.10 | K799 | \$2.50 |
| 1B4 | \$1.00 | 6AV5 | \$1.40 | 6SKGT | \$2.00 | 16A3 | \$2.00 | QV804/12 | \$2.50 |
| 1U3 | \$1.80 | 6B6 | 79c | 6SL7GT | \$1.25 | 25Z6 | \$1.80 | QV804/7 | \$2.50 |
| 6A5 | 75c | 6B6A5 | \$1.58 | 6SLTGT | \$1.00 | 25Z6GT | \$1.00 | RL48 | 75c |
| 6A7 | 75c | 6B6 | \$1.58 | 6SQGT | \$2.50 | 50c | 50c | UL41 | \$1.50 |
| 2D21 | \$1.50 | 6B15 | \$1.80 | 6S31 | 75c | 50c | 50c | UR33 | 50c |
| 2E36 | \$1.50 | 6B36 | \$1.38 | 6U5 | \$1.85 | 47 | 50c | VR53 | 50c |
| 2K3 | 50c | 6B36 | \$1.70 | 6U7 | 79c | 37 | 50c | VR108 | 50c |
| 2A4 | \$2.50 | 6B36 | \$1.45 | 6U8 | \$1.75 | 59 | 50c | VR133 | 50c |
| 6A8 | \$1.50 | 6B36 | \$1.45 | 6U7 | \$1.14 | 40 | \$1.70 | VR138 | 50c |
| 3G5 | \$1.50 | 6B37 | \$1.45 | 6V6GT | \$1.75 | 71A | 75c | VR137 | 50c |
| 3E4 | \$1.50 | 6B36 | \$1.40 | 6X4 | \$1.00 | 807 | \$2.10 | VR138 | 50c |
| 3V4 | \$1.49 | 6C8 | 50c | 6X5 | \$1.45 | 808 | \$1.00 | VT78 (HDE) | 50c |
| 5A3A | \$2.60 | 6C8 | \$1.00 | 1A5 | 40c | 809 | \$2.00 | VT127 | 75c |
| 5A54 | \$1.45 | 6C7 | \$1.45 | 7C3 | 50c | 828 | \$2.00 | VT361 | 75c |
| 5A54G | \$3.75 | 6C36 | \$2.35 | 7C7 | 50c | 832A | \$2.00 | VU38A | 50c |
| DT4 | \$1.75 | 6C25 | \$2.28 | 7E8 | 50c | 837 | 50c | | |

TRANSCEIVER

TR1987, English later version of SCR222 15 watts, 21 Valve, Freq coverage 115 to 145 Mc. Crystal locked receiver. Transmitter uses TT18 output valves. Three single exciter using 4.85 Mc crystal osc. 6AM5, doubler 6AM5, driver amp. QV84 7, p.a. amp. TT18 12-ball modulator, complete with 20 volt generator. Condition as new. To clear \$18.95! Circuit for above unit 16, - clear.

NEW PLUGS AND SOCKETS

| | |
|---------------------------------|-----|
| Octal Plug | 3/8 |
| Octal Socket | 1/8 |
| 9-pin Speaker Plugs | 2/8 |
| 4-pin Speaker Plugs and Sockets | 1/8 |
| 6-pin Jones Plugs and Sockets | 7/8 |
| Pye Plugs | 3/8 |
| Pye double bulk Chassis Sockets | 3/8 |

MODULATION AND DRIVER

TRANSFORMERS

Modulation Transformer, 15 watts, pair of 6AQ5 to 2E36 valve.
Also Driver Transformer, single ended primary, to push-pull grids of 6AQ5.
22 the lot, or Mod Trans. 30/-, and Driver Trans. 10/-

SPECIAL BARGAINS

Carpenster Relay and Socket, Type 3E1.
1800T 250 ohms, 900T 200 ohms, 15/-
P.M.G. Strip Boards, containing 24 Jacks 30/- each
P.M.G. Strip Boards, containing 48 Jacks 50/- each
Head Phone Cords, new 4/6 pair
3-pin Plug and two yds. Cord 4/6
Mixed bags of Resistors (50) 12/8
P/M Fuse Holders 20/-
2 1/2 inch Co-ax Cable, 35 ft. lengths, 3/16 inch diameter 10/-
72 inch Co-ax Cable, 27 yd. lengths, 3/16 inch diameter 20/-
Vibrators, 122 Type 20/- each
122 Aerial Packs 60/- each
12-core Cable with Plug, 22 yards long 50/-
Wrecked 733D Receivers, less valves 40/-
Dural Tubing, 12 ft. lengths, 1/4 inch diameter 3 for £1
P.M.G. Key Switches 7/6 each
Radiogram Chassis—straight-cut, B/C new, completely wired, less valves and speaker, 30/- Tube types 6V4, 6M5, 6BE6, 6BH5, 6BD7 available, extra

NEW VALVE SOCKETS

| | |
|--|-----------|
| 535A Sockets | 20/- each |
| 4/350A | 20/- |
| Acorn | 3/6 |
| EP50 | 3/6 |
| VCR97 | 10/- |
| 806 | 12/8 |
| EA50 | 2/6 |
| 6-pin | 2/6 |
| 6-pin | 2/6 |
| 7-pin | 3/6 |
| 7-pin P.T.F.E. Sockets | 5/- |
| Lockal P.T.F.E. Sockets | 5/- |
| Special completely shielded 7-pin P.T.F.E. socket and shield | 10/- pair |

NEW TOGGLE SWITCHES

S.P.S.T. 5/- each D.P.D.T. 10/- each

POTENTIOMETERS

Wire Wound, 4 Watts, 1 inch diameter.
Sizes available: 5, 10, 30, 50, 100, 250, 500, 1K, 5K, 10K, 50K ohms. 4/- each.

NEW CHANNEL LOCK PLIERS

Type 837W 20/- each
Type 356 End Cutters 30/- each

Q PLUS COILS

| | | | |
|------------------|--------|--------------------|--------|
| AB1 T.V. Balun | \$1.75 | V1F3 L.F. Trans. | 90 |
| AC2 Aerial Coil | \$1.00 | V1P4 | 90 |
| AC3 | 50c | V1P6 | 90 |
| AC4P | 50c | V1P8 | 90 |
| AC4S | 50c | V1P8 | 90 |
| AC7 | \$1.50 | V1P11 | \$1.50 |
| AC9 | \$1.20 | V1P12 | \$1.50 |
| 1P14 L.F. Trans. | \$1.30 | V1P15 | \$1.00 |
| 1P15 | 50c | V1P25 | 80 |
| 1P20 | \$1.00 | V1P28 | 80 |
| 1P24 | 50c | V1P31 | 80 |
| 1P28 | \$1.65 | VW1 | 80 |
| 1P34 | 50c | 300 Reinserts Coil | \$1.00 |
| 1P35 | 50c | 80 RCS | \$1.00 |

ROTARY WAFER SWITCH

1 pair 24 position 1 bank. Physical size: 3 x 3 inch. Price 30/- (\$3.00).

MAGNETIC RELAYS

Sealed Type
24 volt. 670 ohms. D.p.d.t., size 1 x 1 1/2 inch, Price 15/- (\$1.50).
24 volt. 700 ohms. D.p.d.t., size 1 1/2 x 1 inch, Price 15/- (\$1.50).

NEW CHOKES

7-5H. 123 mA. 30/- ea. 14 H. 80 mA. 12/5 ea.

HAM

RADIO SUPPLIERS

Phone 81-1935

Established 1947

Page 23

TASMANIA

More and more of our fraternity are moving to "The Thing" these days. Last week-end I heard Jim JO using only one sideband, and a very good signal too. There are not many sidebanders who can be recognised by voice alone, but several people who heard Jim, including myself, knew who was with him, and even though a commercial rig, a lot more will be heard of the "Eico" in the near future.

As mentioned last month, Council planned to visit the North and North-western Zones during May, well this visit eventuated, and was considered by all to be very successful, indeed it will be recommended that future Councils make an annual visit. At the Northern Zone meeting on the Friday night there were about two dozen members present when five members of Council arrived at about 8 p.m. Saturday afternoon saw 10 members of the North-western Zone at "Lakin's Hall" at Ulverstone, where after the usual formalities, Ian TZZ and Ted TEF repeated their previous evening's explanations relating to the new Federal Constitution. Likewise at the general meeting at Headquarters Zone last Wednesday they were asked very similar questions on practically the same points of the document. We now have the views of the Division on the whole thing, and in particular that one item, 3a, and your Council can now answer and ratify, knowing that all members (interested ones that is) know the facts, and are fully behind them in their decision. While on the subject may I take this opportunity of thanking both Ian and Ted, as well as the other dedicated gentlemen in other divisions, on their behalf, for the amount of work (immeasurable in value) that they have put in in compiling, discarding and re-compiling this new constitution, which will soon be agreed upon, sealed and finished.

Another of our members off Interstate—this time none other than your secretary Crosby ICR, who has, by the time you read this, just had a month in Canberra (work he says) and

who are we to doubt him. Hope you found some time to relax Crosby, and work a few VKIs at least.

Hope you all say a little prayer for the v.h.f. boys who are sitting for the c.w. this month. With any luck at all there should be at least half a dozen in the South who will migrate to the d.c. bands in the very near future. We are struggling with about 18 w.p.m. at the moment, if we get 100% production in the next five or six weeks I think we'll be pretty right.

Don't forget it's only about six weeks to R.D. Christmas. Who wants to win this year? T3's, Geoff VKTZA's.

NORTHERN ZONE

Last month's meeting brought forward some suggestions of a field day, and it was decided to go ahead and hold an exercise. It went off quite well except for some minor incidents, Harry TBR getting lost 15 miles away and out of range of the group, and Peter TFF the case of lost modulation. The day was a success and a good time was had by all who joined in.

Peter TZPD has his hands full of antennae and can't decide whether to leave them on the ground or cleave them higher.

Let's hope you decide soon and maybe you will hear a signal from you.

Harry TBR is building a new mobile rig and will run full 100W. He believes that it will cover 80, 40, 6 and 2 metres a.m., of course. Hope we hear it soon.

Don TEF is relating his modulator and b.f.s. a.m. rig. Duck talk must be hard on the ears.

Len TBQ is rebuilding 80, 40, 20 Tx about 50 watts a.m., so looks like the old envelope carrier is in preference.

Ernan TBW has succeeded in acclimating fatherhood all over again and there's another possible for the Ham bands later on. I am sure that I speak for all when I congratulate you on the occasion.

Antarctica has again reached Lauenston, brrr, or that's the way it feels. Every contact you hear has mention of a radiator or a fire cloak at hand or they complain of cold shocks.

Regular contacts Devonport to Lauenston have been established (12 metres a.m.). Brian TZBW is writing and editing a book on hearing everyone. I believe that the a.m. amp is best, except that it takes off when you are not looking at it. A few trace chains might come in handy.

I believe that Joe ex-TZGJ is returning for a week in July and if Lorraine sees the reins we might even hear or see him. The others are going O.K. for you, Joe, and that the adventure is a success. T3, Frank TZFR.

HAMADS

Minimum 5/-, for thirty words.

Extra words, 2d. each.

Advertisements under this heading will be accepted only from Amateur and S.W.I. The Publishers reserve the right to reject any advertising which, in their opinion, is of a commercial nature, or which is likely to be accepted at P.O. Box 56, East Melbourne, C.I. Via, by 5th of the month and remittance should accompany the advertisement.

COMM. Receiver, Collins 51J4, 500 Kc. to 30.5 Mc. in 30 bands of 1 Mc. each. Xtal filters, noise limiter, three lattice filters (1 Kc., 3 Kc., 6 Kc.). Mint condition, suit connoisseur. Original cost £1,200. Take £550. Melbourne 88-6465 or after 6 p.m., 772-3688.

DRAE 2B Receiver, excellent condition. Includes 230/110v. transformer, speaker, extra 10 metre crystal and instruction manual, £189. J. Bail, VKSABA, 20 Relowes Cres., Box Hill North, Vic. Phone 88-5505.

FOR SALE: BC453 Rx unmod., spotless, \$20. 2 mx conv. E88C, incl. xtal, \$10. KWH. meter on power board, incl. fuses, \$11. 2 mx tuned line QQEC6/40 amp., suit linear or gated mod., rack mtg., plus 8 ft. in. std. rack, \$25. G. Scott, 83-5804, evenings. VK3ZIP.

FOR SALE: Electronics Australia, from Feb., 1956, to December, 1965, 127 copies; June, July, 1957, short. English magazines: Wireless World, from November, 1957, to February, 1962, 49 copies, two short. Practical Wireless, from January, 1959, to December, 1965, 72 copies, few short. Practical Electronics, from February, 1965, to March, 1966, 13 copies; offers. Maurice Batt, Post Office, Rokewood Junction, Vic.

FOR SALE: MR3A FM Carphone, new hammettone finish, crystals for channels A, B, and C, matching a.c. plug-in power supply. Complete with 1½ wave vertical antenna and 30 feet of quality co-ax., gutter mount mobile whip and co-ax., clip-in mobile mount and spare 6360 final tube, £38. Lot 59 Orchard Street, Mt. Waverley, or phone 232-9392.

FOR SALE: Power Supply, 400 volt, 200 mA, choke input, fully filter, 6.4 volt 3 amp., metered, relay control, cabinet, \$27 ea. 886 Rectifier Valves, \$1.50 ea. 886 fil. Transformers, A. & R., \$2 ea. Filter Chokes, A. & R., 300 mA., \$4 ea. Ducon Block Condensers, 4 mfd., 1500 volt, \$2 ea. Ducon Block Condensers, 4 mfd., 1000 volt, \$1.50 ea. All plus freight. David Scott, VK3DY, 174 Johnson St., Maffra, Victoria.

SELL: Commercial S.W.R. Meter, as new, £3. Shure 401A, hi-imped. mobile mike, new, £4. Semi-automatic Morse key, new, £4. 12 volt Bosch alternator, as new, £3. Gelsolo pl-output coil, 10/-, ICPI 1 in. CR tube, £1. Several 6146's, 10/- each. Ring 314-6760 (Vic.).

SELL: CRTs; SAPI, SBPI. Transformers: Henderson multi-tap to 900v. and fil. (for C.R.O.). Ferguson PF285 (battery charger). A. & R. 1894, 300-0-300, 125 mA. and fil. A. & R. 6.3v. x 5 amp., 2 only. Chokes: National 150 mA., National 80 mA. All one price, 10/-, Vic. 314-6760, after 5 p.m.

SELL: Eddystone 680x, mint condition, £100. Vic. 314-6760, after 5 p.m.

TRANSCIVER for sale: 144 Mc. all-transistor ("A.R." Nov. '65). Self-contained, dimensions: 6½ x 3½ x 3½ in. Ceramic tuners, new parts, including imported 7225 Mc. xtal, 3 AF102's, 2 OC71's, OC72, dynamic mike-splcr., Tx section works O.K. but needs alignment. Rx section not good, needs adjustment to regeneration. Price \$14.50. A. D. Proudfoot, Ormond College, University of Melbourne. Phone 34-2201.

WANTED for S.W.L.s: AR7, HRO, B23, BC342, BC346, Hallicrafters, National, CR100, or any set that can be converted for general coverage. Please advise details and price. H. L. Roach, 28 Foster Avenue, Glenhuntly. Phone 58-3757.

WANTED: Receiver NC190 or SX100. Cash to \$300. Phone Adelaide 31-1638 or write J. Thompson, 20 Alexandra Av., Rose Park, South Aust.

COMPUTER CIRCUIT BOARDS

Containing switching transistors, resistors, capacitors, diodes, etc. 20c per transistor.

Also in stock:

OA300-type silicon diodes, 100 for \$4. Everything tax paid and post free. \$3 min.

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Repairs to Receivers, Transmitters; constructing and testing; xtal conv., any frequency; Q5-ers, R9-ers, and transistorised equipment.

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Associate Memberships (and renewals) are available by forwarding £2/14/- (plus 6d. interstate cheques) to:

Business Manager, W.I.A., 49 Cookson Street, Camberwell, E.6, Victoria.

This includes the regular arrival of

"QST"

A LARGE RANGE OF TRANSMITTERS, RECEIVERS, TEST GEAR, AND DISPOSALS RADIO PARTS AVAILABLE

★ BC221 FREQUENCY METER

Complete with Calibration Book, Crystal, and Headphones, \$90.

★ SCR522 V.H.F. TRANSMITTER/RECEIVER

100-150 Mc. Complete with tubes, \$28.

★ A.W.A. MR10 F.M. CARPHONES

70-85 Mc. 2E26 p.a. Complete with all tubes, power supply, control unit, handset, leads and plug for antenna, \$34.

★ COMMAND TRANSMITTERS

4-5.3 Mc., 5.3-7 Mc. Complete with tubes, \$15.

★ TR3624 TRANS./REC.

Approximate frequency, 200 Mc. Contains 46 miniature tubes, \$30.

★ VARIACS, GENERAL RADIO

115v. 500w. New, in cartons, \$6.

★ 3J160E HIGH POWER TRIODES

120 Mc. full ratings. Heater 10v. 29a., anode max. volts 3000v., anode max. current 1000 mA. RF output 2150 watts. \$8 each.

★ VALVES

EF50 20c ea., 7C7 10c ea., CV131 6CQ6 50c ea., 6AC7 20c ea., 6AL5 20c ea.

★ SIGNAL GENERATORS

Type LSG10, 120 Kc. to 260 Mc., \$26. Type LSG11, 120 Kc. to 390 Mc., provision for xtal, \$30, both plus freight.

TE22 Audio Generator, freq. range: sine 20 c/s.-200 k/c., square 20 c/s.-25 k/c., in four ranges. Output, 7v. p-peak. Output impedance, 1,000 ohms, \$42.

★ METERS, P25 TYPE

0-500 uA., \$5.25; 0-100 uA., \$6.95; 0-1 mA. \$4.50; 0-10 mA., \$4.50; 0-50 mA., \$4.50. Full range of Meters and Multi-Testers available.

★ CO-AXIAL CABLE

UR70 72 ohms, 3/16 inch diam., in 27-yard rolls, \$2 plus 75c pack and post. In as new condition.

★ 80-40 METRE TRANSCEIVER

San Electronics QTR7. Tx: 6BQ5 p.a., 6BQ5 modulator, xtal locked. Rx: Tunes 3.5 to 11 Mc., 1 watt audio output, 230v. a.c., \$90.

WANTED TO BUY

Communication Receivers, Test Equipment, etc. Call, write or phone. Equipment inspected and picked up at your convenience any night or week-end.

★ BC348 COMMUNICATIONS RECEIVER

200 Kc.-18 Mc. in six bands. Xtal filter and b.f.o. Genuine original condition, \$90.

★ RA1B COMMUNICATIONS RECEIVER

150 Kc.-15 Mc. in six bands. B.f.o., etc. Genuine original condition, with a.c. power supply, \$70.

★ TR10A MULTIMETERS

100,000 ohms per volt. Ranges, DC volts: 0.5, 2.5, 10, 50, 250, 500, 1k. AC volts: 2.5, 10, 50, 250, 1k. DC current: 10 uA., 1 mA., 25 mA., 250 mA., 10A. Resistance: 20K, 200K ohms, 2 meg-ohms, 20 megohms. To clear, \$25.95.

★ POTENTIOMETERS

Wire wound 40c each; carbon 25c each.

★ RESISTORS

1/4 watt, I.R.C., Welwyn, Eire, Ducon, Philips, \$2 per 100.

★ MINIATURE CAPACITORS

New shipment. 600 v.w. Values: 0.001, 0.02, 0.005, 0.0005, 0.0002, 0.0001 uF. \$2 for 80 plus freight.

★ 1 H.P. 2-STROKE MOTORS

Ohlsson and Rice. Brand new, just imported from America. Weighs only 5 1/2 lbs. 6,300 r.p.m. supplied with 3:1 reduction gearbox, output 2,100 r.p.m. Ideal for driving Alternators for Field Days. Fuel consumption 1 pint per hour. \$30.

★ CRYSTALS

Personal shoppers only, \$1 each.

★ SPECIALS

3AP1 C.r.o. Tubes. New in cartons, £1.25. Vacuum sealed Relays, 670 ohm coil, four change-overs, 50c each. 3500 Type Relays, 50 c each. Dual 3000 Type, £1.50 each. Brand new 4 inch Speakers, \$3. Inter-office Phones, 15-station type, \$4 each. 7-pin skirted Valve Sockets, P.T.F.E., insulation, silver plated, only 20c each, c/w. shield.

★ TRANSISTORS

Brand new. OC72, OC44, 2N132, OC66, OC45, 80c each. AT1138 Power Transistor, 30w., Class B, \$3. Also Diodes: OA71, OA81, OA95, 35c each.

ANY QUERIES

Beginners are welcome, ask Jim and Laurie Gardiner any questions. They are Amateur Radio operators and will be only too pleased to assist.

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NEW SIDAC (Silicon Symmetrical Diode)

The SIDAC is a five-layer semiconductor device (NPNPN) having two terminals, greatly simplifying a.c. control circuits. Being bi-directional, one SIDAC can replace two SCR's in conventional control systems. In addition, blocking voltages are less temperature sensitive in the SIDAC and since there is no reverse direction, voltage transients do not injure the device. Current surges also are less damaging than those encountered in SCR's as the current is not initially confined to a small area near a gate. The SIDAC is cheaper than comparable SCR's. Firing the SIDAC is simplicity itself. Either a parallel or series circuit may be used and a specially developed pulse diode is available with suitable pulse transformer.

Type K5B20: Normal a.c. (r.m.s.) Circuit Voltage—240
—r.m.s. Current capacity 5 amps.

\$3.45 + S.T. 12½%.

Pulse Diode, Type K2C, 78c + S.T. 12½%

Pulse Transformer, \$1.20 + S.T. 12½%.

Please add Pack and Post, 10c Set.

NOTE: A Circuit is available for making a 1,000 watt Light Dimmer using the K5B20, K2C, Pulse Transformer and a few Resistors and Condensers. Write or call for a copy.

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Write or call for Data and Price Lists.

SPECIAL!!

RHEOSTATS 50 WATT 200 OHM

Size: 2½ inch diameter, overall thickness 1½ inch. Shaft diameter 0.235 inch, length from face 1½ inch.

\$2.50 + S.T. 12½% + Pack and Post 10c.

IRISH BRAND MYLAR RECORDING TAPE

American Professional Quality

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| 3 inch | 225 feet | 70c each plus Sales Tax 12½% |
| 5 " | 900 " | \$2.25 " " " " " |
| 5½ " | 1150 " | \$3.00 " " " " " |
| 7 " | 1800 " | \$3.75 " " " " " |
| 7 " | 2400 " | \$5.55 " " " " " |

Please add Postage.

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1N3491—18 Amps. at 50 p.i.v.

Available with either K or A to case, 75c plus S.T. 12½%.
Heat Sink Adaptors to suit, 25c plus S.T. 12½%.

510AR2—1 amp. at 1,000 p.i.v. \$1.20 plus S.T. 12½%

515AR2—1 amp. at 1,500 p.i.v. \$2.00 " " "

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Shaft will work up to 6,000 r.p.m. Intermittently.

\$3 + S.T. 12½% + Pack and Post 10c.



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